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BRITISH AND GARDEN BOTANY.

R. Warner.

BRITISH AND GARDEN BOTANY;

CONSISTING OF

DESCRIPTIONS OF THE FLOWERING-PLANTS, FERNS,
AND TREES INDIGENOUS TO GREAT BRITAIN,

WITH NOTICES OF

ALL PLANTS COMMONLY CULTIVATED IN THIS COUNTRY FOR
USE AND ORNAMENT;

PRECEDED BY AN INTRODUCTION TO

STRUCTURAL AND PHYSIOLOGICAL BOTANY.

BY LEO H. GRINDON,

LECTURER ON BOTANY AT THE ROYAL SCHOOL OF MEDICINE, MANCHESTER; AUTHOR OF "THE MANCHESTER FLORA;" "LIFE: ITS NATURE, VARIETIES, AND PHENOMENA," ETC. ETC.

WITH NUMEROUS ILLUSTRATIONS.

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PREFACE.

THIS book is intended for persons who take an interest in plants and flowers, whether wild or growing in gardens, and who are wishful to acquire a knowledge of such portions of Botanical Science as are useful, agreeable, and easily at command, though without leisure to study Botany in its minute details. Especially is it adapted for the use of private students who do not care to have more than *one* book to learn from, for use in schools, and in private families where there are young people whom it is wished to see interested in the beauty of nature, and intelligently acquainted with its living products. Twenty years' experience in teaching Botany has enabled the author to ascertain what kind of information respecting plants and flowers is desired by the class he writes for, and most needful to be imparted, and in the present volume he has endeavoured to supply it.

BRITISH AND GARDEN BOTANY will be found to be a complete guide to the flowering-plants, trees, and ferns that grow wild in Britain. It also contains notices of all plants that are ordinarily cultivated in gardens, greenhouses, hothouses, and conservatories, and descriptions of very many of them. A great variety of original matter is introduced, bearing upon the uses, methods of culture, and the classical and historical associations of nearly all the plants of interest and popularity that the volume treats of; and the whole is arranged according to the Natural System, or that which classifies plants according to their affinities. The author ventures to say that no work has ever been published in which the "Natural Orders" have been described in a way equally intelligible, or in which the idea and compass of the Natural System have been exhibited so fully for practical purposes. It does not pretend to be exhaustive. That the descriptions of the Orders should cover every possible point, enumerating all the rare exceptions and anomalies, is, in a work of this nature, not requisite. Sufficient particulars are given for the determination of British and usual garden plants, and those who want what would have overloaded and encumbered the book, can easily get it from a Cyclopædia.

Preceding the body of the work is an "Introduction to Botany," in which everything is set forth and illustrated that is necessary to the practical enjoyment of the science in question, and at the end is given a "Glossary of Terms." It is one of the peculiar features of this work that technical terms are dispensed with whenever practicable, and that the descriptions are given in the plainest possible English. The great aim of the author has been to make everything clear, describing things with as few unaccustomed terms as possible, so that with a proper exercise of attention on the part of the learner, the book may be a pleasant and intelligible companion. That there are plenty of books professing the same object, the author of the present one is well aware. But with scarcely an exception, those books are like ladders deficient in the lower steps. They are admirable for the use of students who are already somewhat advanced, but to the beginner they are of small avail. In the present volume it has been endeavoured to supply the lower steps, and thus to render the means of access at once inviting and complete. These recommendations have not been secured by sacrifice of minute scientific accuracy. While making the book simple, due regard has been paid to the claims of Botany as a noble Science. The medical student, the physiologist, and the floriculturist, will in this respect alike find it valuable, and calculated to answer all immediate and important purposes, or at least to aid them materially in their pursuits. The arcana of Vegetable Physiology, and the internal and microscopic structure of plants, occupy, it is acknowledged, only a subordinate place. They come in as a fine supplement to Field and Garden Botany, but they are not indispensable to it. The student who would address himself to these more recondite portions of Botany, will find the works of Dr. Balfour eminently serviceable. The same remarks may be made respecting Botanical Geography, or the history of the distribution of plants upon the face of the earth;—Economic Botany, or the consideration of the uses of plants as food, and as sources of timber, dyes, clothing-materials, &c.; and Medical Botany, or the investigation of their services as remedial agents in sickness. With the limited space at command in the present volume, it is impossible to do more than touch in the very briefest manner upon any of these subjects, all being so comprehensive as to require distinct and formal treatises.

A special feature of the present work is a long-extended general Key, by the careful use of which the merest beginner may ascertain the family or "Natural Order" of any plant he may meet with, and in the case of native plants, and very many foreign ones also, the name as well. This Key is constructed upon a different plan from any other ever published (except the shorter one in the author's "Manchester Flora"), and differs from the keys in all other works in being *practical.*

The way to use it is as follows. Suppose the botanical student, or any one curious in plants, to gather in the hedge a cluster of the flowers of the Bittersweet nightshade, not knowing what the plant is, having no one to ask, or being too independent in spirit and purpose to be beholden to another person for information that may be obtained by a little patience and perseverance. Turning to page 68, he compares his unknown plant with the characters of the preliminary divisions and sections, and presently finds that it belongs to—

A. Flowers Complete
B. Flowers Simple
3. Flowers Bisexual
b. Stamens not more than ten
(2) Ovary superior
Corolla regular
(c) Corolla pentamerous
Stamens exactly five—Class XII. page 82.

Then turning to page 82, as directed, he proceeds in the same manner, comparing the still-unknown plant step-by-step with the characters of the minor sections there set out, and finds that it comes under—

B. Shrubs and undershrubs *without tendrils*
2. Stamens forming a cone, &c.
b. Stamens perigynous
Flowers not glandular—SOLANACEÆ, p. 333.

Page 333 then shows the way to the particular name of his plant, *Sola'num Dulc-ama'ra*, the Bittersweet Nightshade, with information as to place of growth, qualities, &c., and references to three coloured drawings, viz. Curtis ("Flora Londinensis"), vol. i. plate 14; E. B. (Sowerby's "English Botany"), vol. viii. plate 565; Baxter ("British Flowering-plants"), vol. ii. plate 110.

Compare the above series of inquiries with those demanded on behalf of the same plant by the keys in two first-class works of the present day,—keys which if not practical, whatever they may claim to be, must, of necessity, be comparatively useless.

(No. 1.)

- Flowers distinct
  - Both calyx and corolla
    - Petals united
      - Ovary superior
        - Stamens as many as petals
          - Ovary entire
            - Corolla regular
              - Stamens alternate with petals
                - Stamens five
                  - Fruit a berry
                    - Branches herbaceous.

Eleven inquiries, of which the tenth cannot be answered, since the unknown plant is *only in flower*.

(No. 2.)

- Leaves net-veined
  - Both calyx and corolla
    - Corolla monopetalous and inferior
      - Ovary and fruit simple
        - Ovary with two or more cells
          - Stamens upon the corolla
            - Stamens four or five, not didynamous
              - Cells of ovary with many ovules
                - Fruit two, or improperly four-celled.

Nine inquiries, of which the fifth and eighth are enigmas, while the last cannot be answered at all, since the unknown plant is *only in flower*.

The Key in the present volume requires, it is true, no less than *thirteen* of such inquiries; but the answers are *all within reach*. The Key to British and Garden Botany provides a clue likewise to *garden plants*, whereas the keys in the works quoted above apply only to wild ones, and thus to a less number by many thousands. Characters such as are employed in those works doubtless have their value, but the object of a key is to enable the learner to *determine the name of his plant while it is in flower*. This is impossible if any portion of the requisite knowledge be made to depend on possession of the *ripe fruit*. Beginners, moreover, do not want, neither can they appreciate, minute scientific characters. They want to learn their plants by a process they can use, and to learn them *promptly*.

Under every family comprising more than two or three species, there is given a table or Analytical Chart of such members of it as grow wild, partly "artificial" and partly "natural," and similar to that which supplies the name *Dulcamara*. Every expedient is made use of in the Charts (as previously in the Key) that will take the student quickly to what he wants; but his attention is still called to the inmost and highest principles of Botany, which are never to be forgotten or subordinated. The privilege of a teacher is not more to make his subject intelligible and attractive, than to remember that all science is of royal blood, and its dignity never to be sacrificed or ignored. The Key, it must be understood, is not so much a key to the place of the plant in the Natural System, as to its whereabouts in the book, and the same is to be said of the Charts.

The experienced botanist who may read these paragraphs, is invited to test the practical character of the Key now offered, and its comparative value, by putting himself mentally in the position of a student wholly ignorant of the plants, and "working out" a few such as *Arum maculatum*, *Typha latifolia*, *Cuscuta Europæa*, *Adoxa moschatellina*, and *Paris quadrifolia*. Test it by a few such as even *Hyacinthus nonscriptus*. Test also the practical character of the Charts by working out a few such plants as *Bellis perennis*, *Senecio vulgaris*, and *Hieracium Pilosella*, afterwards trying the same plants by the keys in any other works extant, and with the same mental reservation of previous botanical acquaintance with them.

From the foregoing remarks it will be seen that the author's desire in this volume is to introduce the lover of plants, by the easiest and pleasantest path, to an intimate knowledge of everything growing wild in the fields and woods, upon the shores, in the streams, and on the mountains of our native islands, and to give along with this some few particulars respecting such flowers and trees cultivated in gardens, shrubberies, and greenhouses, as are frequent, and likely to attract attention. So far as regards the wild plants, the book is a British "Flora"—that is to say, a book descriptive of our indigenous vegetation. The name is a pretty one, and in the restricted sense usually given to it, no doubt very useful. But to an admirer of nature, a flower is a flower. Those who love plants are seldom found asking whether a given flower be indigenous or exotic; they wish to know what they have got, and care little for its ancestral birth-place. Besides, in a country that has been plentifully inhabited and diligently cultivated for centuries, there are numbers of plants and trees in a semi-wild condition, which the young botanist cannot possibly distinguish from the aboriginal; and many of these introduced plants are much more attractive and of more frequent occurrence than is the case with hundreds of our truly native species. To be useful under all circumstances, a "Flora" should include both the introduced and the wild species, so long as care is taken to say which they are. This is done in the present volume. Every wild-flower is described at sufficient length for its name to be ascertained; the places where it grows are mentioned, and if it be very rare, the counties and the localities are specified:—every introduced plant is described in the same manner, and a clue is furnished to the purely garden species. That clue consists in descriptions of every family of plants of which any species is likely to come under observation, and in the insertion of those families in the general Key.

As regards the Species included in the work, though persuaded that many are not genuine, I have thought it best not to omit mention of any British forms that are by authors described as "species," but to insert the whole, and say what they probably are. Those which are no longer found growing in our islands, and are not likely to re-appear, are mentioned as historic only, and doubtful ones and garden runagates are described as such. Not that the disappearance of a plant from a given station implies that it is *absolutely* lost, except under special circumstances. Seeds often lie dormant in the ground, and the plant comes up again after a time,—as frightened animals feign death to escape the hunter, and when the danger is past, jump up and run away. Doubtless several plants once found wild are now totally lost to Great Britain, and should no longer be included in Floras; but their places have been supplied by others that have come in as colonists from abroad (brought accidentally in ballast, or with seed-corn, or other articles of commerce), and these latter, on the same principle, should be included, with the intimation that they are foreigners. FLORA is always on the alert to repair injuries, and if certain plants be effaced by building, cultivation, and the selfish rapacity of collectors, others are supplied in a few years.

Surprise will no doubt be felt by some that no generic characters are given. Genera can only be learned from the contemplation of many species of a genus. A very large number of our British genera contain only one native species each, so that there is nothing for the student to compare and collate. What may be the limits of the genera in some of the largest and most important families, is subject moreover to great diversity of opinion, and while the magnates dispute, the simple student had better wait, and look to families and species.

As regards the scientific nomenclature of the plants spoken of, it may be observed that no pains have been taken to call them by the *newest* names. Substantial and well-known names, except when there is a generally-acknowledged impropriety in them, are preferred to new and continental ones, and none are adopted for the sake of mere "conformity." There is a strong tendency among sound and thinking botanists to maintain the nomenclature imposed by Linnæus, and for my own part I prefer to abide by it as nearly as the progress of Botany will permit.

In the choice of *English* names a greater latitude has been taken. English names are not only often very unmeaning and inappropriate, but extremely deceptive, and if we rely upon them as indicating relationship among plants, we are sure to be led into error. Rose, violet, laurel, lily, grass, are names applied to many plants that have only a casual and external resemblance. Daisy, nettle, and moss, as popularly applied, are also of very vague signification. The aim in the present volume has been to select the most elegant and appropriate, and to discard, as far as possible, names conferred from mistaken notions. The English name is given first, and the Latin one afterwards, the latter printed in Italics, and accented.

Finally, all native plants, not expressly stated to be annual or biennial, are understood to be *perennial;* all plants not described as aquatic, to be *terrestrial;* and all trees not described as evergreen, to be *deciduous*. The stated time of flowering is that when the plant is in its pride. Individuals may be found both earlier and later, especially of species that love the stubble left by the reaper, and of others that hold on till frozen to death.

SPECIAL INSTRUCTIONS HOW TO USE THIS BOOK.

Read the Introduction with care and attention, so as to obtain a general idea of the structure of plants, and of the nature of "families."

On gathering a plant in the fields or a garden, with a view to learning something about it, examine the flower carefully, and if necessary, dissect it, referring at the same time to the General Key in the way above pointed out. By this means the family will be found, and probably the species, the figures telling the page where both are spoken of particularly.

In dissecting, take, if possible, several blossoms; make clean vertical sections of the entire flower, as far down as the peduncle; lay open the corolla, and observe how the stamens are attached; and take a *horizontal* section of the ovary as well as a vertical one. Use a *sharp* knife, and a little pocket-magnifier, such as may be bought for a shilling.* Remember that the stamens are best seen in the mature but unexpanded bud (from which none of the anthers have been lost), and the pistils best in flowers that are overblown. If possible, examine a seed-pod. Make it an invariable rule, in reading descriptions, never to pass over a single term the precise meaning of which you do not thoroughly understand. Refer to the Glossary, if at a loss. *Skip nothing;* every word is put down for a special purpose. And do not jump at conclusions.

If it be the family that is found, turn to the page referred to, and see if the plant agrees with the general account there given; then trace it out by means of the Analytical Chart that follows, which, if it be a wild plant, will guide speedily to the name.

If it be a foreign plant, the name will not appear in the Chart, but will probably be mentioned in the remarks that come after the "Habitats and Distribution" of the wild species, and which are printed in smaller type. "Bot. Mag." following the name of an exotic plant signifies that there is a coloured drawing of it in the "Botanical Magazine."

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* The student should, if possible, provide himself with a good microscope. A binocular, of moderate size, very easy management, excellent optical quality, and price so moderate as to be unobjectionable, is manufactured by Mr. J. B. Dancer, of Manchester. Another, on the single-tube principle, also well-adapted for ordinary use, and which has been strongly recommended by the Society of Arts, is manufactured by Messrs. Field and Son, Birmingham.

Having ascertained the English name by use of the Chart, notice the number attached to it, and that will show the way to the place in the "Habitats and Distribution," in which the Latin name and other particulars are added. The "habitat" of a plant signifies the *kind* of place in which it grows, as in woods, or fields, or ponds, &c.; the "distribution," whereabouts in the country it is to be found.

If perplexed by one blossom, dissect another, and if they all seem to differ, take the average; the truth cannot be altogether concealed. Besides, it may be that the first was not examined with care. Botany is not a study for the uncareful, but for the attentive, and if it seem hard to learn, the blame is most likely *not* with the plant. Do not be impatient, thinking to accomplish all at a dash, but proceed deliberately, step by step, taking care to understand, as you go on, what has been done, and what there is still to do. Lastly, when botanizing, do no damage to trees or fences, or to standing corn, or to grass waiting for the scythe; and if you should find a rare plant, *do not root it up*. The true botanist loves to see plants living and growing, and it is only the mean and selfish who would pluck up a rarity, perhaps the only and last blossom, merely to make a mummy of it, and call it a "specimen."

ERRATA.

In a work of this nature, slips of the pen are inevitable. The following should be corrected.

PAGE.

92. Line 14. For *Xanthorhiza* read *Myosurus.*

153. Line 15 from bottom. For five read ten.

164. Line 25. For nearly linear read needle-shaped.

210. The leaves of *Skimmia* are not articulated.

231. Line 17. Omit reference to Channel Islands. Both *rosea* and *deltoidea* are common plants.

338. *Ramonda* is a genus of *Acanthaceæ.*

368. Lines 14—16. These three lines belong to *M. collina.*

397. Last line. For *Diplacus* read *Hexacentris.*

399. Line 10. For opposite, read undivided.

414. Line 20 from bottom. *Columnea* belongs to the *Gesneraceæ.*

414. Line 19 from bottom. Omit the words "or *Rhodochiton volubile* (Bot. Mag. lxi. 3367.);" the latter being a different plant.

415. Line 18 from bottom. *Tweedia* belongs to the *Apocynaceæ.*

448. Line 5 from bottom. E. B. iii. 149 represents *Crepis taraxacifolia.*

600. Last line. For spiral vessels, read dotted ducts.

INTRODUCTION.

Botany is the science which considers the nature of Plants,—how they are constructed, what they are composed of, the circumstances of their life and growth, what they are good for, the countries and places they inhabit, their various and charming beauty, along with many other curious and interesting facts such as render the study of it exceedingly pleasant and instructive, both to young people and old, at all seasons of the year, and wherever we may go.

There are thousands of different kinds of plants. Some grow on land, others in the water; and of these latter not a few belong to the sea. Many lift their heads high into the air, and throw out beautiful and spreading branches, so as to form trees, which in many cases, when autumn arrives, are loaded with fruit; other kinds are so small and delicate that, in order to see them plainly, we must use a microscope. Between these two extremes there are multitudes of intermediate size, comprising garden flowers, wild flowers, shrubs, vegetables fit to eat, weeds, moss, and whatever else forms part of the green mantle of the earth. The whole of them receive the botanist's attention, and reward him with something useful and satisfactory to know.

The individuals constituting this vast assemblage have, in every case, their peculiar features. Just as the elephant, the rabbit, and the glossy rook are distinguished among animals by their peculiar shape, habits, and colour, so are plants distinguishable from one another by the variety in their leaves, flowers, stems, roots, and seeds. Everyone knows how different a camellia is from a daisy, and a sprig of parsley from a red-berried bough of Christmas holly;—everyone is familiar with the grass of the green fields, so soft to the foot, so cheerful and refreshing to the eye, and sees for himself, without any identify its manifold lovely objects, we no longer look at it as at the faces of the people in a strange town, but with the happy feeling of being at home, and among companions. The great value of learning the families, on the other hand, or rather the fine correlative advantage, each pursuit bearing upon and augmenting the success of its fellow, lies in the illustration which plants cast upon one another; for agreement in structure implies, to a considerable extent, similarity also in properties and uses. When we find a plant bearing a flower composed of four distinct petals, arranged in the form of a cross moline, and having certain peculiarities in the internal parts (explained in the following pages), we may presume that that plant is wholesome,—not necessarily agreeable to the tongue, but devoid of anything deleterious. The turnip, the cauliflower, water-cresses, and many other esteemed vegetables, belong to this family, any member of which, however great a stranger, or found for the first time by an emigrant in some distant country, may be eaten with confidence, provided it be juicy and palatable. With the Nightshade-family it is the reverse. Here we must expect venom, cruelty, and even death. Every one has heard of the Deadly-nightshade, that malignant plant which hangs out its tempting berries to the imminent peril of those who eat. It is proper to remark, however, that families which contain poisonous species, are not upon that account noxious in every case; the rest of the family may be harmless, and here and there even wholesome. Making all allowance for this, a great point is still gained in knowing where we are safe, and where we are probably in danger. Similarly, and further illustrating how largely structure and particular properties go together, the Poppy-family is narcotic, the Buttercup-family acrid, the Myrtle-family aromatic, the Gentian-family bitter, and, in medicine, usefully tonic. Other families are remarkable for the strong fibres of their stalks, their mucilage, their sourness, their colouring matters, and so on, though always with the limitation mentioned in the case of the poisonous plants; and many and most valuable have been the discoveries made among their different species by the light of the great principle these facts exemplify. This is not the only reward. A great and noble aim always wins variety of recompense. In studying the families of plants, our eyes are opened not only to matters of bodily interest, or such as have relation to food, clothing, and medicine, but to that grand and wonderful concord and consanguinity of things which far more than the bare fact of their existence declares so plainly the wisdom and love of Him who made them. The beginning of our contemplation of Nature must always and necessarily be devoted to *differences;* as we ascend, we find that the highest and most beautiful part of knowledge is that which traces *resemblances*, and that resemblances resolve at last into unity, as the scattered trees of the plain, surveyed from the mountain-top, become a forest, and fill the eye as a single leaf.

Let us now proceed to consider the parts of which plants are composed, and by the peculiarities of which they are distinguished and associated. It must be premised that plants are either "perfect" or "imperfect," or, to speak more correctly, "complex" and "simple," since nothing in nature is absolutely imperfect, but everything modelled after a type that is perfect in its own way. The difference in its objects as regards structure, is merely that of greater or less diversity of constituent parts. "Perfect" plants are those in which all or nearly all the parts ever entering into the fabric of trees and flowers, are present in high and beautiful development, a special organ being appropriated to every different function. The chief criterion is the presence of a Blossom, formed in the way presently to be described; in practice, indeed, this is the only infallible test, for occasionally, even where blossoms are present, the other portions of the structure are of exceedingly low development, whereas none of the plants comprised in the great division called "Imperfect" ever produce blossoms such as we refer to. "Perfect" plants form the great mass of the *conspicuous* vegetation of our earth. With a few exceptions, the members of the other great class are inconspicuous, people in general scarcely knowing of their existence. They are replete with wonderful beauty nevertheless, delighting the true lover of nature not more with their delicate and unexpected forms, than with the simplicity of their organisation, competent as it is to the performance of every one of the offices which in Perfect plants devolve on as many servitors. We shall take the "perfect" division first, as naturally most attractive to taste and fancy, and opening the pleasantest avenues to botanical knowledge.

However large and complex a plant may be, and whether tree or herb, its parts are all resolvable into these five:—

THE ROOT,
THE STEM,
THE LEAVES,
THE FLOWER,
THE FRUIT OR SEED.

Some of these parts often bear curious appendages, such as hairs, thorns, stings, prickles, and tendrils; but there is never any other distinct member, and the tallest tree is only a repetition of them over and over again. Not that the whole five are always present, even in perfect plants. The mistletoe has no true root, the crocus no true stem, the cactus no true leaves. But there are few plants in which we may not find the greater portion, under some shape or other, when we have learned what strange disguises they are prone to assume. For if Nature seem playful in the myriad shapes of her rosy sea-shells, and in the plumage of her innumerable bright birds, with no less gaiety does she amuse herself here.

To make everything clear and precise, it is necessary that we now begin to use special terms,—not "hard" ones, but merely unaccustomed, like the names of new acquaintances, which yet in a week or two become as familiar as oldest friends'. Botanical terms are often thought particularly difficult and numerous. It may be so; but Botany can be studied and enjoyed in spite of them. In the present volume as few as possible will be introduced, and none without explanation, either in the text, or in the shape of a drawing alongside, or in the glossary at the end of the book. Technical terms cannot be dispensed with, if we would master a subject. Every branch of knowledge has a language of its own, and it is quite a mistake to suppose that Botany can be made an exception. The simple fact of its variety and beauty implies a vocabulary to match, just as a large and populous country implies in its towns and cities a map full of names of places. To attempt to dispense with technical terms altogether, would be indeed as hindering to the real progress of the student, as uncomplimentary to his intelligence. A few select ones are invaluable. Those which will be found in the present volume are so exact, so expressive, so easy to learn, and so indifferently translateable into words of colloquial speech, that it would be a far greater pity to leave them out than it will be troublesome for the learner to make them his own. They have not to be learned all at once, but one by one, as they are wanted and become interesting. They are brought together here, in the Introduction, not so much with a view to their being read and committed to memory in a lump, like a lesson at school, as for convenience of illustration and future reference.

THE ROOT.

The Root is that strong, underground part of the plant which holds it firmly in its place,—as anchors hold ships,—and also sucks up water, and transmits it to the stem above. Generally speaking, it consists of two portions, one stout and thick, and more or less branched, called the "caudex;" and issuing from this, a vast quantity of slender fibres, resembling threads. In small plants the caudex varies from the size of a quill to that of a man's arm, and is dry and woody, or soft and juicy, like a turnip, according to the use it is designed for. Sometimes there is no proper caudex, and the root is fibrous throughout. The caudex of the roots of trees often grows to be nearly as large and massive as the boughs, but in either case the fibres or rootlets are slender and thread-like. The point of every fibre is soft and spongy. It is here alone that water is sucked up, and from this circumstance it is called the "spongiole." The reason why flowers, after being transplanted, hang down their leaves and often die, especially in warm weather, is that the spongioles get injured, and many of them broken off, during the process. When a good ball of earth is preserved about them, they sustain no hurt, and the plant will bear removal even on a hot summer's day. Some plants have portions underground which are *not* roots, as tulips, onions, snowdrops, lilies, and even potatoes. Take, for example, the onion. The white fibres hanging down underneath the round and solid part alone are roots. The onion itself is a kind of great underground bud, as shewn by its numerous leafy layers. Underground buds of this description are very common in certain families, and are well known by the name of "Bulbs" or "Bulbous roots." (Figs. 1 and 2.) Potatoes are different again. The potato plant, in addition to the stems which it elevates into the air, sends out many more below the surface, much after the manner of the runners of a strawberry, only that they do not extend beyond twelve

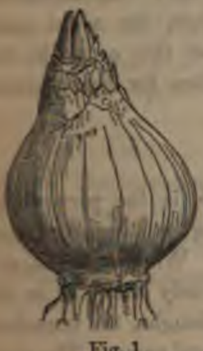
Fig. 1.

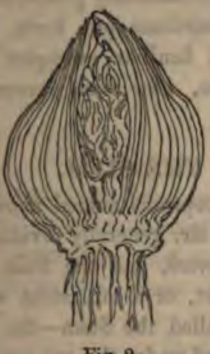
Fig. 2.

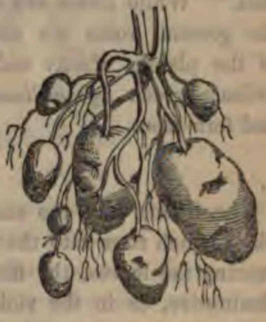
Fig. 3.

or eighteen inches. After a while, these underground stems stop growing, but sap continues to flow into them from above, and, there being no escape for it, accumulates at the extremity, where it gradually forms the potato, just as a stream of water, suddenly checked by a fallen bank of earth or other obstacle, accumulates behind the barrier, and forms a pond. The real roots of the potato are the brown fibres that hang down from it. (Fig. 3.) Many plants form lumpy underground masses of similar nature, though not exactly in the same way. Along with the potato, they are called "Tubers" or "Tuberous Roots." The Iris, the wood-anemone, and several others, have a thick underground horizontal stem, technically called a "root-stock" or "rhizome." Another modification is seen in the crocus, which is shaped like the onion, but solid throughout, and is called a "cormus." While stems are occasionally produced below the surface of the ground, roots are sometimes put forth from the aërial parts of the plant. Pretty and familiar examples of this occur in the delicate green *Lycopodiums*, now such favourites for green-houses and fern-cases.

THE STEM.

The Stem, with the exceptions named above, is the part of the plant which rises into the air, generally dividing into branches, and bearing the leaves, the flowers, and the fruit. Whether weak and diminutive, as in the violet, or a tall, stout woody pillar, as in the trunk of a tree, it is still called the Stem—the boughs, the branches, and the twigs being included under the one general name. The chief points to notice in the Stem are the shape, the direction, and the amount of branch. Usually it is round, but in small plants often four-cornered, or three-cornered, and sometimes deeply furrowed. In the everlasting-pea it is curiously winged; in other plants covered with hair, wool, down, scurf, or prickles. A few plants, such as the hemlock and dragon-arum, have it spotted and blotched with purple. At short intervals along the stem, there are knots or joints. These are called "nodes," and the lengths of stem lying between them, the "internodes." (Fig. 4, *a*, *b*.) The *direction* taken by the stem is very important to notice. Usually it is erect, sometimes remarkably so, as in the Italian poplar; but in small plants it often lies prostrate, or nearly so, and is then called "procumbent." When a procumbent stem takes root at every joint, and sets up outposts, as in the strawberry, it is called "creeping." (Fig. 6.) The stems of the honeysuckle, the hop, the scarlet-bean, and many others, being too weak to stand upright, and more ambitious than the procumbent kinds, lift themselves towards the sun by twining round their stronger neighbours, or whatever slender column may be nearest, some kinds turning to the right, and others to the left. (Fig. 5.) The nasturtium, Virginian-creeper, ivy, fumitory, and many other weak-stemmed plants, ascend by curious methods which quite remind us of the contrivances of instinct. The variety in the degree of branching is illustrated in the stems of grasses and those of trees. The former have scarcely any branches, and, with all of similar nature, are called "simple;" while the latter, spreading freely in all directions, are termed "compound." If very straggling and irregular in its branches, the stem is called "diffuse;" and if repeatedly forked, like the mistletoe and the *Radiola*, "dichotomous."

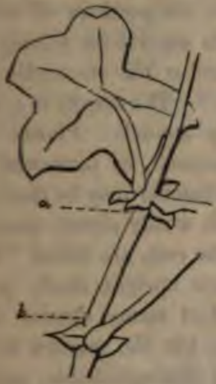

Fig. 4.

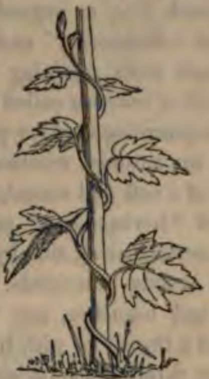

Fig. 5.

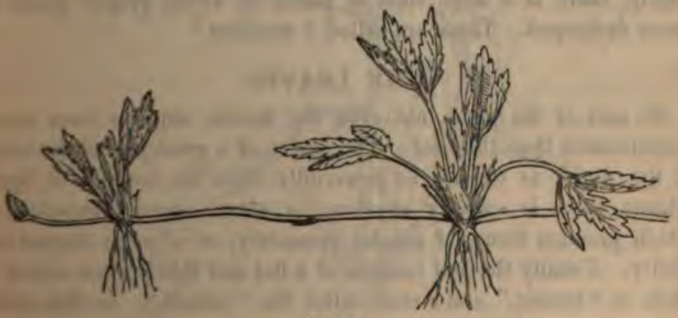

Fig. 6.

Partly on the duration of the stem, and partly on that of the root, depends the length of time a plant exists. There are three principal descriptions of lease or term of life in plants. Those which live for only a few months, say from spring to autumn, and then die of exhaustion, or are cut down by the frost, are called "Annuals;" those which live, as regards their roots, for portions of two years, are called "Biennials;" and those which survive for a long series of years, their roots retaining vitality, whether the stems die down in the winter or not, are called "Perennials." The turnip is a biennial; yellow lupines and sweet-peas are only annuals. Plants that die down in the autumn, whether annual, biennial, or perennial, and all that are of a soft and succulent nature, whatever may be their stature, are called "herbaceous;" perennials with woody stems, many of the latter generally rising side by side from the root, are called "shrubs;" tall and woody perennials, with a single upright shaft, producing boughs and branches, are "trees." Most stems consist of wood, bark, and a thread of pith in the middle, like the marrow in a bone. But these three elements are not always distinguishable, and in one large class the distinction does not exist. They are best seen by cutting through the branch of a tree in such a way as to get a horizontal section of the respective parts. Fir-trees show the nature of bark very well, and young stems of elder the nature of pith. Grasses and plants of the Parsley-family often have hollow stems. Lastly, there is a large class of plants in which proper stems are never developed. These are called "stemless."

THE LEAVES.

No part of the plant, not even the flower, requires more careful consideration than the Leaf. The source of a great part of the beauty of the world, as we feel so powerfully when the verdure of Spring returns, there is scarcely anything in nature more diversified, or which presents forms of greater symmetry, or of more elegant simplicity. Usually the leaf consists of a flat and thin portion called the blade or "lamina," and a stalk called the "petiole." In this state it is termed "petioled" or "petiolate." (Fig. 7.) But it often happens that the petiole is not developed, and that the blade grows directly from the stem; it is then said to be "sessile," literally "sitting close," (Fig. 8.) and if so intensely sessile as to embrace the stem, "clasping," or "amplexicaülent." Such leaves often have projecting extremities at the base, called "auricles," or "little ears;" and there are cases where the projecting parts meet upon the opposite side of the stem, and grow together by their edges, making it appear as if the stem passed through the middle of the lamina. (Fig. 9.) The leaves of thistles and some other plants have their margins continued

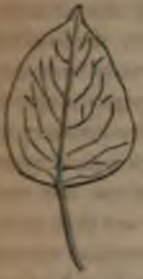

Fig. 7.

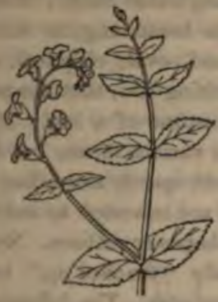

Fig. 8.

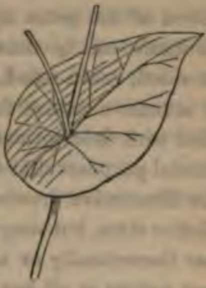

Fig. 9.

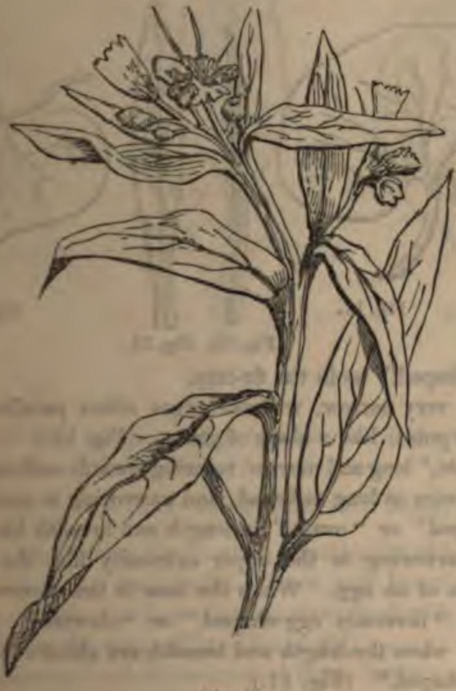

Fig. 10.

down the stalk, giving it a winged or bordered appearance. In this case they are called "decurrent," literally "running down." (Fig. 10.)

The blade is of every imaginable shape, from the long narrow ribbon of the grass up to the broad angular shield of the rhubarb. No figure can be drawn, round, oval, elliptical, square, three-sided, six-sided, seven-sided, or anything else, that has not already been used by inventive nature for the outline of a leaf. Many pages might be filled with descriptions of the various forms, but it is unnecessary for general purposes that we should specify more than the principal types. The illustrative drawings are not intended to indicate sizes, not even relative sizes, but simply the shapes or outlines. Neither are they in any case theoretically or artistically "touched up," but sketched directly from nature in all her waywardness. The following are the chief:—

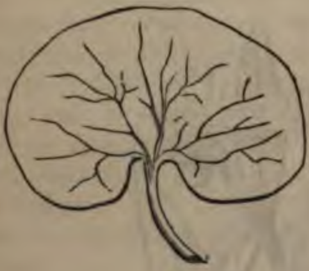

Fig. 11.

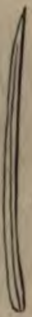

Fig. 12.

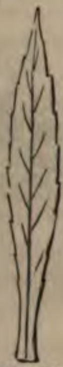

Fig. 13.

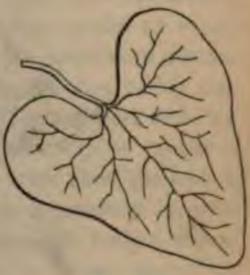

Fig. 14.

"Needle-shaped," as in the fir-tree.

"Linear," very narrow, with the edges either parallel or tapering to the point, like a blade of grass. (Fig. 12.)

"Lanceolate," long and narrow, tapering towards each end. (Fig. 13.)

"Oval," twice as long as broad, and narrowing to each end.

"Egg-shaped" or "ovate," in length and breadth like the former, but narrowing to the upper extremity like the longitudinal section of an egg. When the base is the narrower end, it is called "inversely egg-shaped," or "obovate." (Fig. 17.)

"Round," when the length and breadth are about equal.

"Kidney-shaped." (Fig. 11.)

"Heart-shaped." (Fig. 14.)

"Triangular." (Fig. 16.)

"Hastate," arrow or spear head-shaped. (Fig. 15.)

The preceding are called "simple" leaves, because consisting of a single blade or lamina. There is another large class termed "compound" leaves, in which numerous small blades or "leaflets," each with a short stalk of its own, are combined into a symmetrical whole. Of these there are two principal forms, and several minor varieties, the important characteristic in every instance being the attachment of the component leaflets to the main stalk by means of a swollen and hinge-like joint, which enables them, in many cases, to move upwards and downwards, as in the sensitive-plant and the wood-sorrel. Compound leaves are scarcely ever sessile, but on the contrary, usually provided with long petioles. The lotus is the only example of the former among our wild-flowers.

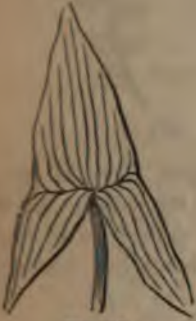

Fig. 15.

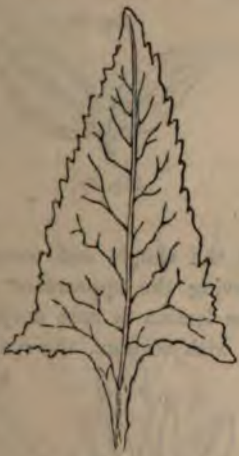

Fig. 16.

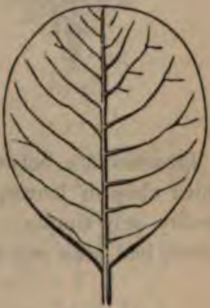

Fig. 17.

The following are the chief varieties and their names:—

"Pinnate" or "feather-like," when several pairs of leaflets proceed laterally from a main stalk. There may be only two or three pairs, or thrice or four times as many, and with or without an odd one at the end. (Figs. 18 and 21.)

"Doubly-pinnate," when, instead of single leaflets, there are as it were smaller pinnate leaves.

"Binate," when there are only two leaflets. (Fig. 20.)

"Trifoliolate," when there are three leaflets. (Fig. 19.)

"Quinate" and "Septate," when there are five or seven leaflets, all from one point. (Fig. 23.)

"Digitate," when the leaflets are numerous, narrow like fingers, and all from one point. (Fig. 22.)

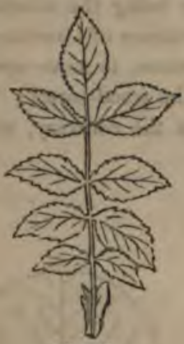
Fig. 18.

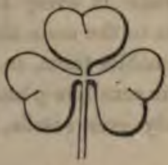
Fig. 19.

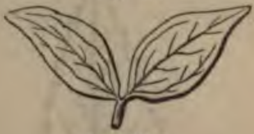
Fig. 20.

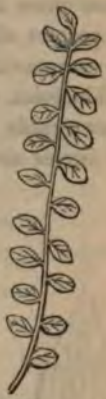
Fig. 21.

Intermediate between the simple and compound, there is yet a third class of leaves, having the appearance of the latter, but in reality only simple. The lamina is here deeply gashed, as if large pieces had been cut out with scissors, the "segments" or "lobes," as they are called, being more or less combined at the base, like the toes in the webbed foot of a water-bird, and of course without a hinge. They are spoken of as "divided" leaves. The varieties are exceedingly numerous, but the study of them is greatly facilitated by their

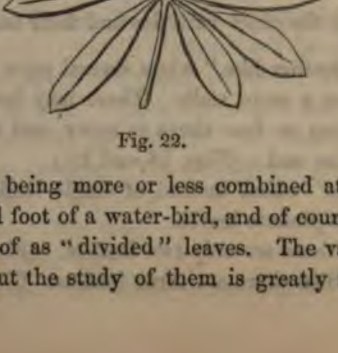
Fig. 22.

resolvableness into three principal kinds, two of which sportively imitate the pinnate and digitate among compound leaves. So close is the resemblance of some divided leaves to the really pinnate and digitate, that in books they are called often by the same names.

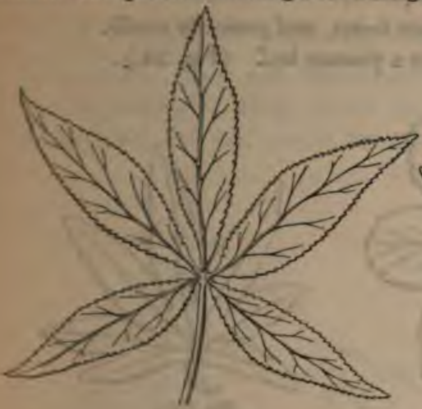

Fig. 23.

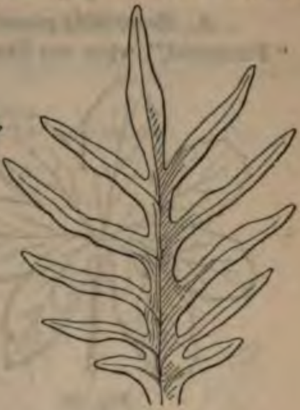

Fig. 24.

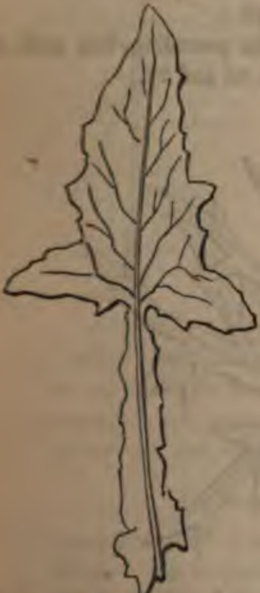

Fig. 25.

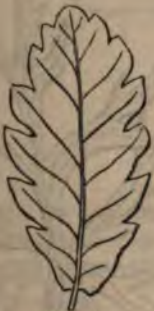

Fig. 26.

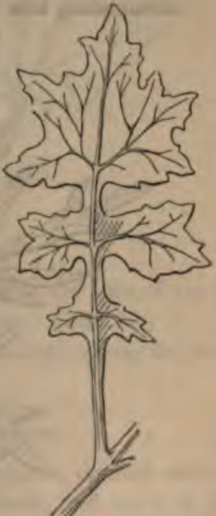

Fig. 27.

They are immediately distinguished by the want of the hinge-like joints. The following are the principal modifications:—

A. *Resembling pinnate leaves, and generally sessile.*

"Pinnatifid," when cut like a pinnate leaf. (Fig. 24.)

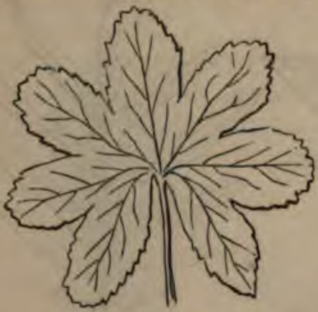

Fig. 28.

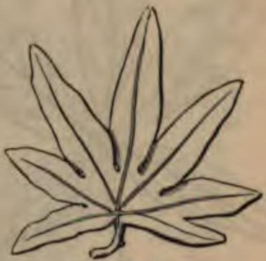

Fig. 29.

"Feather-lobed," when the segments are few, shallow, and directed upwards, as in the oak-leaf. (Fig. 26.)

"Lyrate" or "lyre-shaped," similar to the preceding, but with the terminating lobe very large. (Figs. 25 and 27.)

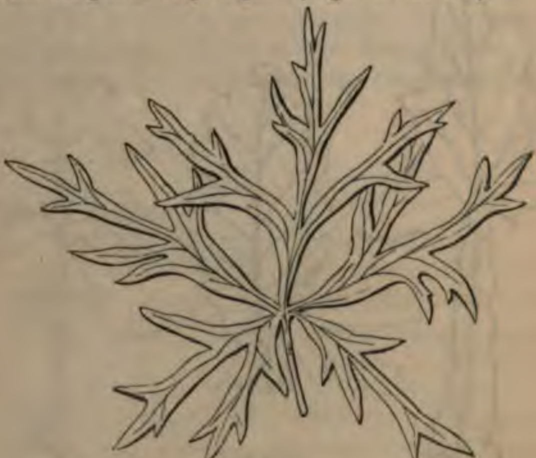

Fig. 30.

"Runcinate," when the segments are pointed, and directed towards the base of the leaf, as in the dandelion. (Fig. 31.)

"Pectinate" or "comb-like," a pinnatifid leaf, with very narrow, close, and parallel segments, resembling the teeth of a comb.

"Doubly-pinnatifid" and "triply-pinnatifid," when the lobes or segments are themselves cut and divided, as in the tansy leaf.

B. *Imitating the digitate leaf, and generally upon stalks.*

"Fan-lobed," when with five or more great clefts directed towards the leaf-stalk. (Figs. 28 and 32.)

"Fan-lobed and cut," as in the purple monkshood. (Fig. 30.)

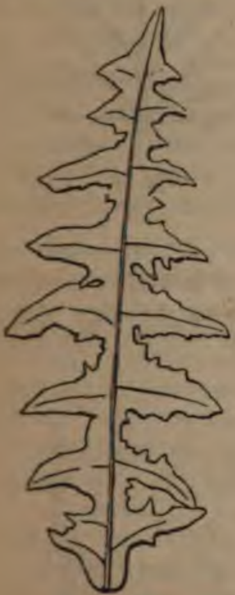

Fig. 31.

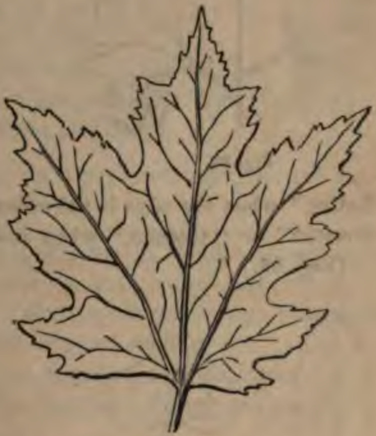

Fig. 32.

"Palmate," when the clefts extend nearly to the base of the leaf, as in the most kinds of passion-flower. (Fig. 29.)

"Ternate," when resembling a trifoliolate leaf, as in the strawberry and the wood-anemone.

C. *Triangular in general outline.*

"Triply pinnatifid," a leaf with many branches, divided and subdivided, as in parsley, celery, hemlock, and most of their family. (Fig. 33.)

Next to the general figure and composition of the leaf, it is important to notice what kind of *edge* it possesses. The terms used for the varieties here met with are applied both to simple leaves and to the leaflets of compound ones. Those enumerated below are all very common.

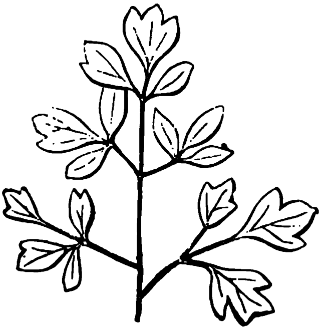

Fig. 33.

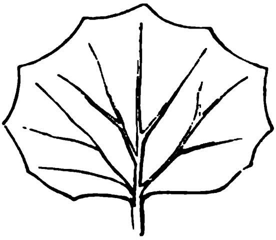

Fig. 34.

"Entire," when the edge is unbroken. (Fig. 36.)

"Serrated" or "toothed," when resembling the edge of a saw. (Fig. 35.)

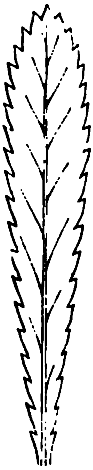

Fig. 35.

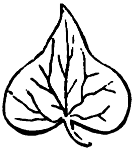

Fig. 36.

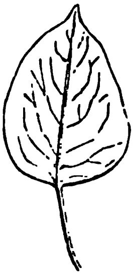

Fig. 37.

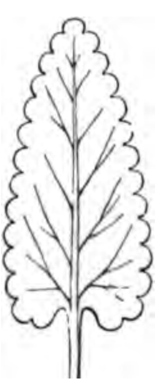

Fig. 38.

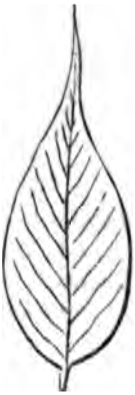

Fig. 39.

"Prickly," when the teeth extend into long sharp points, as in holly.

"Crenate," when the teeth are rounded, as in betony. (Fig. 38.)

"Ciliated," when set round with fine hairs resembling eye-lashes, and which lie in the same plane as the lamina, beautifully exemplified in the newly-expanded foliage of the beech-tree.
"Waved," when the edge is in little concaves and ridges, after the manner of the drawings of sea-waves. (Fig. 34.)

After this we must observe the point, or extremity which lies remotest from the petiole; or if a sessile leaf, then remotest from the stem. It is called—

"Pointed," when as in Fig. 37.
"Acute," when the point is fine.
"Acuminate," when long drawn out. (Fig. 39.)
"Obtuse" or "blunt," when rounded off. (Fig. 17, p. 13.)
"Abrupt," when the end seems amputated.

The surface has likewise to be considered, the principal varieties being designated as follows:—

"Glabrous," when bald, or totally devoid of down or hairiness.
"Glossy," when not only glabrous, but polished and shining.
"Downy" or "pubescent," when covered with soft, short hairs.
"Hairy," when the hairs are few, and stand erect.
"Bristly," when the hairs are very stiff, as well as erect.
"Silky," when the hairs are long and white, and lie flat, as in silverweed.
"Rough," when like an elm leaf.
"Puckered," when like a primrose leaf.
"Glaucous," when of a blueish or gray-green colour, as in the carnation.

All these conditions incessantly recur, the different outlines, points, edges, surfaces, &c., being combined in hundreds of different ways, and constituting the finest and oldest heraldry in the world.

Looked at against the light, and often without recourse to this, leaves are seen to be traversed in all directions by delicate lines. These indicate sap-tubes and threads of woody matter, and are called the "veins" or the "ribs," and sometimes the "nerves." The mode of their dispersion is exceedingly important to notice, being concurrent with peculiarities of structure in the stem, the flowers, and other parts, and often a ready guide to the family a plant belongs to. There are six principal varieties.

"Net-veined," when the veins and veinlets branch and interlace in every direction, a very common occurrence. (Fig. 41.) The large, robust vein generally proceeding from the leaf-stalk to the upper extremity, and dividing the lamina into two nearly equal portions, is called the "midrib." (Figs. 31 and 40.)

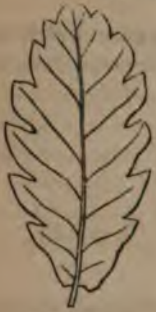

Fig. 40.

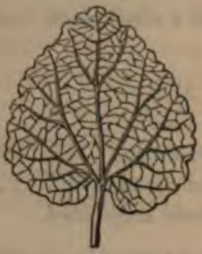

Fig. 41.

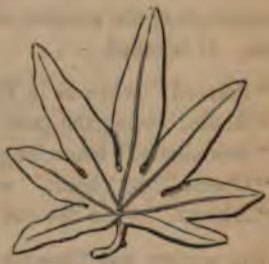

Fig. 42.

"Feather-veined," as in the hazle and Spanish chesnut. (Fig. 40.)

"Fan-veined," when the primary veins are like the ribs of a lady's fan, as in the sycamore and Fig. 42.

"Ribbed," when there are three or five great longitudinal veins, as in rib-wort and the cinnamon-tree. (Fig. 43.)

"Parallel-veined," when numerous fine veins run side by side, without any interlacing, and converge gradually to the point, as in the lily-of-the-valley. (Fig. 45.)

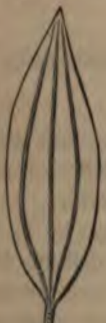

Fig. 43.

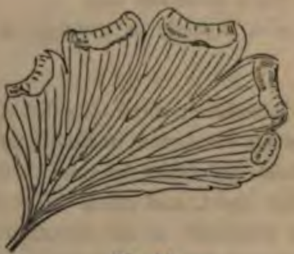

Fig. 44.

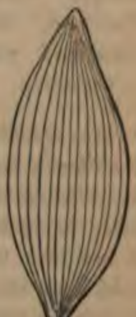

Fig. 45.

"Fork-veined," when like the letter **V**, with smaller **V**'s proceeding from the points, which never unite or even approach. (Fig. 44.) This occurs only in ferns and some of the yew-tree family.

Held between the eye and the light, leaves sometimes appear pricked full of little holes, such as a needle would make. These are usually minute receptacles of oil, rendering the leaf translucent in those places. Leaves in which they occur are said to be "dotted."

In many families of plants there are appendages to the leaves, the presence of which frequently helps much to the discrimination of them. Two principal kinds are observable, called respectively "stipules" and "tendrils."

Stipules usually resemble a pair of little wings, growing one upon each side of the petiole. Sometimes they are enormous in proportion to the leaf, as in the pansy; sometimes they are reduced to thorns, as in the Robinia, and sometimes to minute scales. Fig. 49 shews their form in the rose-leaf. Stipules must not be confounded with dilated conditions of the petiole, such as occur in the Buttercup-family.

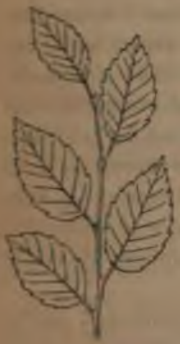

Fig. 46.

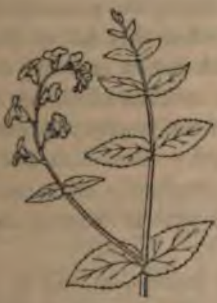

Fig. 47.

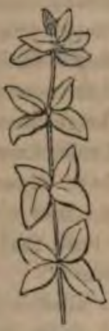

Fig. 48.

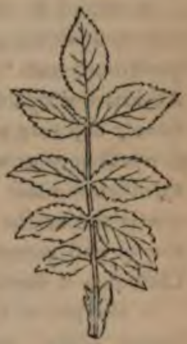

Fig. 49.

Tendrils are those beautiful little twining green fingers which we see at the extremity of such leaves as those of the pea, enabling the plant to grasp the nearest prop, and ascend into the air. They are either simple or branched. Tendrils, however, are not always portions of leaves, being sometimes modifications of other organs.

Finally, there is the position of the leaves upon the stem, a circumstance always of great moment. We find them either growing in pairs, each leaf pointing in a contrary direction, when they are called "opposite;" (Fig. 47.) or singly, when they are "alternate;" (Fig. 46.) or in a ring, like the spokes of a wheel, when they are called "whorled" or "verticillate." (Fig. 48.) If alternate leaves are distributed irregularly over the stem, they are said to be "scattered;" and when either opposite or alternate ones are very close together, and pressed against the stem, so as nearly to conceal it, they are "imbricated." This last is very prettily shewn in young branches of the common heather; the others are plentifully exemplified in every field and every garden. The leaflets of compound leaves are also said to be opposite or alternate, according to their position upon the petiole. When the plant does not develop an aërial stem, and the leaves spring immediately from the ground, they are called "radical," or "from the root," as well illustrated in the primrose.

The space between the stem and the petiole of the leaf, on the upper side of the latter, is called the "axil" or "arm-pit," from its resemblance to that part of the body reversed. It is from the axils that almost all buds, twigs, and flowers are sent forth; and to denote this, when important to be taken notice of, it is said that they are "axillary."

In regard to duration, leaves are called "evergreen" when they remain upon the plant or tree during the winter in a green and living condition; and "deciduous" when they fall at the close of autumn. All leaves drop and are renewed sooner or later, the evergreen ones merely enjoying a longer lease, and, like all things of nobler privilege, given as springs of refreshment and beauty when evanescent summer splendours shall have departed. How rich and cheering at midwinter the bright green of old England's indomitable wild holly, that sturdy and sacred bush that laughs at frost as complacently as the Christmas it decorates!

A few plants are absolutely leafless, as will be mentioned in the proper place; and there are others, such as the furze, in which they exist only as thorns.

The use of the leaves is to convert the crude watery matter sucked up by the roots into proper vegetable substance. They have been compared, because of this, to the digestive organs of animals; and as their functions are respiratory in addition, or of the nature of breathing, they have been compared also to the lungs. To enable the breathing and digestion to proceed, the whole surface of the leaf, both on the upper side and the under, or at least in all land-plants, is clothed with a delicate skin or "cuticle," which abounds, particularly on the under side of the leaf, with little mouth-like pores, called "stomates." The stomates open and shut, according to circumstances, and are distinctly seen with a microscope, if a piece be stripped off and put in water, with a bit of glass over to keep it flat. The best kind of leaves to select for the purpose are those of juicy plants, such as lilies and orchids.

Now as to the law of their action. Chemical experiments have shewn that vegetable life is endued with the wonderful power of decomposing the carbonic acid of the atmosphere, and that this process is effected in the leaves, during the day-time, or when the sun shines. The oxygen is set free, and the carbon retained in the leaf, and applied, along with the water and other matters absorbed from the soil and air, to the manufacture of the wood, the pulp, the peculiar juices, and everything else that enters into the composition of the plant, each particular product being sent down, as fast as made, into the root, or the stem, or some other part of the general storehouse underneath. In a word, after the plant has emerged, like an infant, from the seed, its enlargement is entirely owing to the Leaves, which come out fresh and fresh every spring, work diligently all the summer, and having wrought their manifold and useful works, each in its own way, die as quietly and contentedly as they have lived, beautiful images of all true and noble souls, and in their decayed remains replenish the earth anew.

If leaves be not developed, the surface of the stem is provided with a cuticle which answers the same purpose.

THE FLOWER.

The Flower is by no means the simple thing it appears at a distance. Ordinarily there are present in it no less than four distinct parts, two of which are composed of still more delicate ones. There are important varieties also in the general structure of flowers, rendering it necessary to separate them at the very outset into the three following classes:—

Complete and Simple.
Complete and Compound.
Incomplete.

We shall take them in the order named, confining our attention first to Complete and Simple flowers, such as the lily, the polyanthus, and the lilac.

The most striking and beautiful portion of such a flower is that wherein the colour usually lies. Botanists call it the "corolla" or "little crown," the flower being the consummate glory of the plant, that which makes and signalizes its day of greatest honour, like the placing of the diadem on the brows of a king or queen. Generally speaking, the corolla is composed of many separate pieces, which can be picked off one by one. These are called the "petals," and a flower is said to be three-petaled, four-petaled, five-petaled, &c., according to their number. When more than ten are present, the flower is called "polypetalous" or "many-petaled." In some families the petals grow together by their edges, and form a kind of cup or bell. The flower is then said to be "monopetalous" or one-petaled,"—but only because of the *appearance*,—there is no such thing in nature as a really one-petaled flower; and save for the term being old and current, it would be better to discard it, as only tending to create mistakes, and supersede it with "sympetalous" or "joined-petaled." In the convolvulus and many other flowers the lines of junction are plainly evident, resembling seams, and are frequently of a darker colour than the intermediate parts of the corolla, ornamenting it with stripes. If the petals be united for only a portion of their length, as in a campanula, the corolla is said to be "lobed" or "divided," the appearance being that of a cup with deep clefts in its margin. According to the number of petals composing such corollas, they are called four-lobed, five-lobed, &c. But we must be careful to remember that all such seemings of lobes or divisions come, in reality, of the part-way adhesion of as many distinct petals as there are points and spaces between.

In shape, size, and position, the petals vary greatly, their differences giving rise to the chief part of the wonderful diversity so much admired in flowers. The principal distinction thus originated is that of "regular" corollas and "irregular" ones. Those are called "regular" which, like the mallow and the primrose, consist of a fixed number of petals (whether separate or united does not matter), uniform in size and figure, and arranged symmetrically round a central point, like the rays of a star. (Figs. 50, 51.) "Irregular" corollas are the contrary of this, comprising the very numerous varieties, where two or more of the petals are different from the others, both in figure and dimensions, as happens in the speedwell, the sweet-pea, and the violet. (Fig. 52.) Occasionally the petals, though of similar form, are of two different sizes, a large and a little one being placed alternately. In this case the corolla is still perfectly "regular," the proportions and balance being true, though the dimensions of the two sets of petals are dissimilar. Some of the gentians supply examples. In other cases an irregular corolla *mimics* a regular one, as happens very often in the Foxglove, Verbena, and Gloxinia families, and their allies. There is a simple and infallible rule for distinguishing all such *quasi*-regular corollas from true ones, namely: a truly regular corolla, on being revolved between the finger and thumb, presents, like a wheel, neither top nor bottom, satisfying the idea of symmetry whichever part is uppermost and whichever part is at the side. Not so with an irregular corolla. However closely it may simulate a regular one, it shews, when we revolve it, a discordance between the upper portion and the lateral, and generally also between the upper and the lower. There is always a more or less obvious top and bottom, and there is generally in one or other of these portions some peculiar mark or colouring not exhibited in any other part. Next in importance is the particular *shape* of the corolla, which of course is chiefly determined by that of the component petals. When the latter are united as in Fig. 54, the corolla is termed "campanulate," or "bell-shaped;" when as in Fig. 55, it is said to be "tubular, star-shaped above;" when like the cardamine, "cross-shaped," or "cruciform;" when like a buttercup, "rosaceous." It is unnecessary to specify more of the forms here, as they will be described and illustrated in suitable places further on. Irregular corollas, as well as regular ones, have many varieties, the principal forms receiving special names. Another important matter to notice in connection with the corolla is the "æstivation," or mode in which the the petals are folded or rolled together in the bud, and which is plainly seen when they are about to open. This is various, and often extremely curious, and families are often partly distinguished by the peculiarities it presents. Sometimes the petals are spirally twisted; sometimes they are laid flat, like the leaves of a

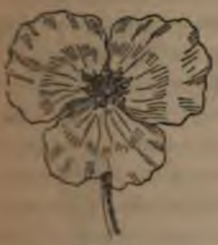

Fig. 50.
Regular flower.

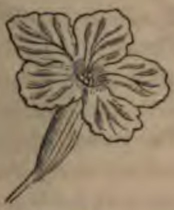

Fig. 51.
Regular flower.

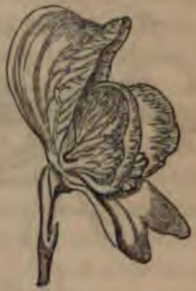

Fig. 52.
Irregular flower.

book; in the poppy they are crumpled like a handkerchief as it lies in the pocket. A similar principle of arrangement governs the elements of the leaf-bud, which are equally diversified, but always lie in the same way in the same kind of plant. The folding is here termed the "vernation," the leaf-buds having reference to the spring, while the flower-buds are associated with summer.

Outside and underneath the corolla there is a green vase, generally about a quarter as large, and consisting, like the corolla, either of several independent pieces, or of a definite number united by their edges. The component pieces are called the "sepals," and the total of them is the "calyx." (Figs. 53, 54, 55.) While the blossom is yet a bud, the calyx encloses and protects the petals; but with the opening of the latter, it falls back, and sometimes drops off altogether. This is the case with the poppy, which has a large and beautiful calyx of two sepals, between which, when they begin to separate, we may discern the rich crimson inner vesture, but they are so lightly attached that the expansion of the petals pushes them off at the same instant. Green for the most part, and usually inconspicuous, there are many cases where the calyx emulates the bright hues and splendid fashion of the corolla, and sometimes even eclipses them. The fuchsia and the scarlet-flowering currant are familiar examples. It often happens, too, where the petals are not developed; the calyx then takes their place, both in magnitude and shewiness, as in the clematis, the marsh-marigold, and the hepatica. With flowers, as with all her other gifts, Nature, if she closes one hand in denial, straightway opens the other in munificence. It is known to be the calyx by analogy; it very

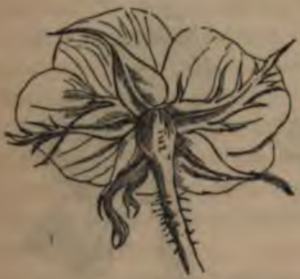

Fig. 53.
Back of Rose, showing calyx.

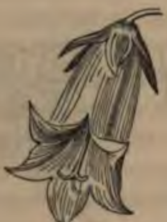

Fig. 54.
Calyx and corolla.

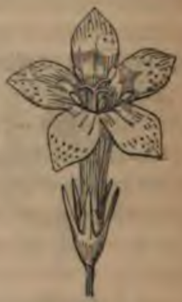

Fig. 55.
Calyx and corolla.

seldom happens moreover that a brilliant corolla is destitute of protecting calyx. In other words, the outermost part of the flower, whatever its colour and texture, is, with very rare exceptions, *calyx*, under some condition or other. In the lily-family and its allies the calyx is almost always on a par with the corolla, both in development and lustre. Here it is known to be calyx by the *position* of the sepals, which parts, as a rule, form an outer set, alternate with the petals, and cover their edges like a curtain behind half-opened folding-doors. It is very unusual to find the petals exactly *in front* of the sepals, though we have a ready example of it in the berbery. In that beautiful spring-flower, the Anemone, the blossoms *seem* to be formed in the same way that they are in the lily-family,—*i.e.*, they appear to have a calyx of three white or coloured sepals, and a corolla of three petals to match, and placed alternately with the sepals. But all six pieces are genuine sepals, and corolla is entirely wanting. Such a condition of the flower as we find in the lily-family never occurs in plants that have net-veined leaves, of which the anemone is one; nor does it ever occur in flowers having more than nine stamens—the anemone possessing a hundred or more. In the Cactus, the numerous petals and sepals are so much alike that it is impossible to say where the corolla ends and where the calyx begins; the extremely outermost and the inmost are alone of decided character. In the Rhododendron and a few others the corolla is brilliant, but the calyx is reduced to a mere ring, its protective office being here subserved by special organs called "bracts." A very minute calyx, sometimes only a rim or raised border, is met with also in many of the Parsley-family, in many more of the Daisy-family, and in Valerians. When the sepals are combined by their edges into a cup, and often when they are unconnected, the calyx is "permanent" or "persistent,"—that is to say, it remains until the fruit is mature, though it may wither in the meantime. In the strawberry it continues green, and in some of the Nightshade-family it increases in size, and acquires a beautiful red colour, so as to resemble a new flower. The calyx is much more frequently "regular" than the corolla, even when the latter is quite the reverse, as in orchids; but frequently, on the other hand, it is irregular when the corolla is not so. That is to say, a regular corolla is accompanied sometimes by a regular calyx, sometimes by an irregular one, and *vice versâ*. In texture, the calyx, with the exceptions named above, is usually leaf-like, whereas the petals are succulent, and with a surface resembling satin.

In the very centre of the flower stands the "pistil." This important organ is generally of a green tint, but sometimes white or coloured, and consists of three distinct parts, which, in relative form and position resemble the three portions of a Corinthian column. The lowest part resembles the pedestal, and is called the "ovary;" the summit, resembling the capital, is called the "stigma;" and the intermediate stalk, resembling the shaft, is called the "style." (Fig. 58.) In the ovary lie concealed the rudimentary seeds, or "ovules," as may be seen in the wood-hyacinth, the seed-pod being this very part enlarged into a state of ripeness. Sometimes the style is not developed, and then the stigma sits close upon the ovary, and is said to be "sessile;" sometimes it is feathered; and sometimes the stigma is nothing more than a fine point. There are examples also of several styles to a single ovary, and of several stigmas to a single style. Moreover, there are many flowers, such as the buttercup, where the ovaries themselves are numerous, every one of them having its own style and stigma. Ordinarily the pistil is hidden by the petals, lying in the very heart of the flower, modest and guarded from view. But there are examples where the style is so much elongated as to bring the stigma forwards like a beautiful pendent gem, as very prettily exemplified in the fuchsia. The ovary is usually divided into compartments, called "cells," and is spoken of as one-celled, two-celled, three-celled, &c., according to their number. When there are *several* cells, the ovary is said to be "compound," since every cell is in reality a little ovary in itself, and the apparent division of the ovary into compartments, is merely the result of their intimate lateral adhesion one to another. It is by reason of the ovary being compound that we often see the two or more distinct styles just now alluded to; and the same is the usual origin of the two or more stigmas often found terminating an apparently simple style. Of course there are curious anomalies; the flowers of Thrift have five styles to a one-celled and one-seeded ovary; Geraniums have five separable ovaries, five styles united into a single shaft, and five free and elegantly recurved stigmas. It may be added that the style is usually hollow, or, more properly speaking, "tubular."

In one large class of plants, the ovary, instead of being inside the flower is *below* it. This last-named is a very curious condition, and one which can only be explained by supposing that the lower portions of the calyx and corolla have adhered so intimately to the outer surface of the ovary as to become a portion of its skin, the upper portions of the sepals and petals being lifted, as a natural consequence, to the summit of the ovary, upon which they *appear* to be seated. Fortunately for this doctrine, which is without question the true one, there are many instances in which the adhesion is only partial, as happens in Melastomaceæ and certain saxifrages. Usually the coalescence is complete, and then the ovary looks like a green berry, as we may observe in the snowdrop and the fuchsia. When the ovary is thus underneath or below the flower, it is technically called "inferior;" when it is enclosed and concealed within it, "superior." An "inferior" ovary not infrequently resembles a peduncle, and is extremely liable to be mistaken for one by the inexperienced, especially among willow-herbs, and in the beautiful Chinese shrub called Weigela. A careful consideration of Figs. 61, 62, and 63, will make this matter more intelligible.

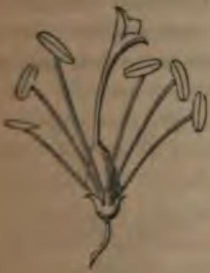

Fig. 56.
Stamens and pistil.

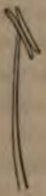

Fig. 57.
Anther and filament.

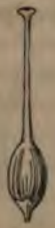

Fig. 58.
Pistil.

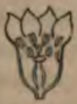

Fig. 59.
Opened corolla, shewing sessile stamens.

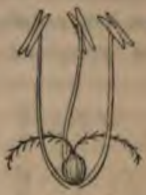

Fig. 60.
Stamens and two feathery styles.

Standing round the pistil are "stamens," (Figs. 56, 60.) slender little bodies, usually consisting of a delicate stalk, and upon its summit a kind of bead, round, oblong, or kidney-shaped. The stalk is called the "filament," and the bead-like head the "anther." (Fig. 57.) The anthers alone are indispensable, so that we need not be surprised at often finding them sessile and concealed in the cavity of the corolla. This occurs in the mezereon, where the eight little sedentary anthers are easily discoverable. (Fig. 59.) In lily-form flowers, such as the daffodil, the stamens are exceedingly well-shewn, being large and tall. They are conspicuous, too, in the fuchsia, the gentianella, and the cactus; those of the latter resemble a tassel of white silk. In the mullein, the Lancashire-asphodel, and the spider-wort, the filaments are ornamented with coloured hairs, and a similar decoration is occasionally found upon the anther. The latter organ is a box, usually of two compartments, and containing a light powder called "pollen." Most flowers have yellow pollen, but it varies to scarlet, blue, white, as in the convolvulus, and even to black, as in the tulip. Every one who has watched bees at work, will remember how they creep out of the honied caverns of the flowers, all powdered and bespangled with golden dust. Examined with the microscope, there are few things in nature of more rare and astonishing beauty than the anthers and pollen.

The *position* of the stamens supplies characters of the highest importance. Sometimes they grow upon the distended summit of the flower-stalk, called the "receptacle," quite independent both of the ovary and of the surrounding calyx and corolla, which can be removed without affecting them; (Fig. 61.) sometimes they adhere to the sepals or petals, springing as it were from the inner surface; (Fig. 62.) and sometimes they grow, along with the latter parts, upon the summit of the ovary. (Fig. 63.) In the first case they are technically called "hypogynous," in the second "perigynous," and in the last "epigynous." It is important, when the stamens do not exceed ten, to observe whether they are placed against the *centre* of the petals, or against the *edges*, that is to say, whether "opposite" the petals, or "alternate" with them.

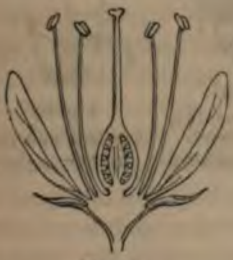

Fig. 61.
Hypogynous stamens.

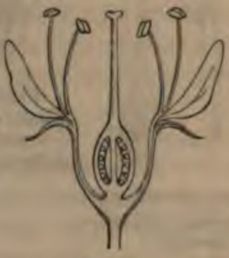

Fig. 62.
Perigynous stamens.

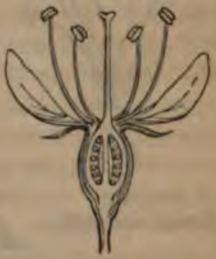

Fig. 63.
Epigynous stamens.

The stamens are not always independent of one another. The filaments often adhere at the lower part, sometimes forming several clusters, and in the Mallow-family they combine so as to form a tube. The anthers are no less apt to adhere. The immense family of which the daisy is the type, has united anthers for one of its chief marks; and a similar thing occurs exceptionally in the gloxinia, the pansy, and many others. Sometimes there is a fixed difference in the *length* of the stamens. The Sage-family has two long and two short ones; the Cabbage-family, four long and two short; and when there are ten or eight in a flower, one-half are very often twice as long as the remainder, as in the wood-sorrel and the Clarkia. The form and position of the stamens are best seen in flowers just about to open; the pistils shew best in flowers that are overblown.

Such, then, are the four grand constituent parts of Simple and Complete flowers; the calyx outermost, generally green and inconspicuous; then the corolla, usually coloured and radiant; then the stamens; and, in the midst of all, the pistil. When an extra part *appears* to be present, it is a modified form of one of these four, and is generally a special honey-cup or "nectary." Remarkably beautiful instances occur in the grass-of-Parnassus, already mentioned, and in the purple monkshood, the nectaries of which flower resemble two little birds. The passion-flower is adorned with a splendid supplementary crown of rays, and the narcissus with an elegant vase, which encircles the stamens.

A term remains to be mentioned here, namely, "perianth," one of the most useful that has been contrived. Unfortunately it is used in various senses by different authors,—some restricting it to the calyx of flowers that have no corolla; others applying it to such a calyx only when petaloid; while others again apply it only to such flowers as those of the lily-family, where the calyx and corolla are similar in colour and texture. Etymologically, the word means "encircling the stamens and pistil;" it properly denotes both "calyx and corolla," whether alike or unlike, and if no corolla be developed, then it is equivalent to "calyx." In short, the perianth is the whole set of leafy organs that surrounds the stamens and pistil, no matter what they consist of. When both calyx and corolla are present, we say "perianth double;" when there is only a calyx, "perianth single;" when there are neither, "perianth absent." Such is the signification which the term always bears in the following pages.

As soon as the flower has attained its full development, and shines in the sweet perfection of its beauty, the anthers open, and their pollen is conveyed over to the stigma. How this is effected, is not yet known, or at least very imperfectly. Insects have been supposed to aid the process, and no doubt they do in some slight degree; the wafting of the air may also give a little assistance; perhaps there is some kind of attractive power in the stigma, which draws the particles of pollen towards it as soon as they come within its sphere, as a magnet draws the atoms of steel-filings, only that in the flower it is vital force instead of physical. Generally speaking, it must be regarded as one of those interesting mysteries which are reserved for the pleasure of future ages; for nature takes her own time to reveal her secrets, not telling them all at once, nor to a single generation, even to the most diligently observant, but a few to one, a few to another, alluring us no less with her riddles than her smiles. Numberless contrivances are met with in different flowers calculated to facilitate the process, such as power to spring forwards on the part of the stamens, greater length of the pistil in pendulous flowers, and of the stamens in erect ones, both circumstances enabling gravitation to come into play,—and presenting, in their aggregate, some of the most captivating examples of the Divine adaptation of means to end anywhere to be found in nature. That the pollen-grains may be in no danger of falling off, or being blown away, the stigma becomes moist with a clammy exudation as soon as it is ready to receive them, and until the exudation commences, they have neither hold nor effect upon it. To the same end, the stigma is often covered with minute points, among which the pollen-grains become infixed. And, to gain time, we often find again that the anthers do not all burst at once, but consecutively, so that showers of pollen may fall upon the stigma for hours and days together. This is exquisitely illustrated in the grass-of-Parnassus. The passage and the anchorage of the pollen-grains being accomplished, after awhile a fine thread of semi-fluid matter exudes from the end of every grain that has effected a lodgment, and pushes its way through the style into the ovary, where it enters an ovule, fertilizing it with power to ripen into a seed. The petals and stamens, along with the style and stigma, and usually the calyx, then wither more or less completely; the ovary meantime swells fast, and gradually enlarges into the "fruit."

The *purpose* of the calyx and corolla is thus simply to guard and shelter the stamens and pistils. They play no direct part in the preparation of the seed, as proved, negatively, by the circumstance of many flowers being devoid of them. The calyx and corolla, are in fact, elegant apparel, with which nature, in her exquisite taste and delicacy, decks her favourites during the hours of their hymeneals, keeping it folded in reserve till the energies of stamen and pistil shall effervesce, and the poet's song of the loves of the plants become no fable. The corolla fulfils its office in the most beautiful manner. The petals are drawn together at the base, or combined into a cup; or, if unconnected, they close at night, and when it rains, so as to form a tent, in every case tenderly shielding the parts within; and when the sun glows warm and bright, they turn towards it and spread wide open, that the life-giving flood shall pour in abundantly, and be reflected from their surface, as by mirrors. The folding of the petals no doubt serves a second purpose. While they become curtains for the interior of the flower, the inner surfaces, sprinkled with pollen, come more or less into contact with the stigma, and impregnation is facilitated.

Some plants have their stamens and pistils in *different* flowers, and even upon different individuals. The analogy of the animal kingdom gives to such the name of "unisexual;" those where the two kinds of organs are contained in the same blossom being called "bisexual." Individually, those flowers which possess stamens only are called "male," and those which contain pistils only "female." Most of the unisexual plants have the two kinds of flowers differently formed. The hop bears its stamens in large, light, branching clusters, but its pistils in oval catkins; while in the nut and the oak the former grow in pendulous catkins, and the pistils are enclosed in buds. The finest examples of unisexual flowers are supplied by the cucumber family and by Begonias. Occasionally it happens that plants belonging to families properly bisexual, are, through incomplete development, of only one sex, as in the common red lychnis of our hedge-banks, the flowers of some individuals being wholly male, and of others wholly female.

The *numbers* of the several pieces of the calyx and corolla, and also of the stamens, are very important to notice. Most flowers have their parts in *fives;* a second class is constructed upon the number *three*, and a third has the parts in even *fours;* every number varying at times into its multiples,—five into ten, three into six and nine, four into eight and two. The stamens often greatly exceed ten, as in the buttercup and the poppy; the pistils also are occasionally very numerous, again as in the buttercup, but in general they are the fewest parts of any, and in the majority of flowers there is but one pistil, or at least only one in appearance. It seldom happens that the *petals* exceed ten, except in "double flowers;" the best examples among single ones occurring in the Ice-plant family and in the larger kinds of cactus. Ordinarily every flower keeps to its own multiples, five or ten sepals implying five or ten petals, and five or ten petals implying five or ten stamens; but sometimes the numbers are a little intermingled, as three with five, and two with five. In such cases it is judged by the predominant number, or by analogy, to which of the three great classes the flower belongs, the corolla being consulted first, then the calyx, and lastly the stamens. With unisexual flowers, it is safest to take the male or stamen-bearing.

These three great types of floral structure, as regards number, are called "pentamerous," "tetramerous," and "trimerous," the first including all flowers that are formed upon the number five, and its multiples; the second, those in which the number four, with its multiples, is predominant; and the last, such as illustrate the number three, and this whether both calyx and corolla be present, or only one of these parts, and whether the flower be regular or irregular. (Figs. 64, 65, 66.)

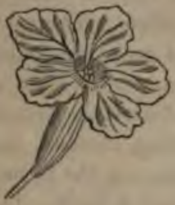

Fig. 64.
Pentamerous flower.

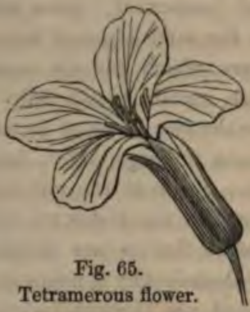

Fig. 65.
Tetramerous flower.

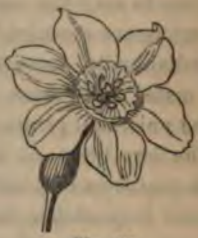

Fig. 66.
Trimerous flower.

"Double flowers" originate under cultivation, and now and then in the wild state, in an immense extra development of the corolla, many circles of petals being produced, one within the other. Generally this is at the expense of the stamens, which, in double flowers, are usually dilated into petals, of course losing their anthers, except in partially-double flowers, which show the transition very plainly. Partially-double tulips, white water-lilies, and camellias often show every gradation between perfect stamen and perfect petal. It is not *necessary* to the production of a double flower that the stamens should be changed into petals, though double flowers certainly occur oftenest where the stamens are numerous to begin with. The double columbine retains its numerous stamens, and double roses and many others often do the same. Nor is it necessary to the production of a double flower that the stamens should originally be numerous—as well proved by the double tulip and the double daffodil, which in their single state have only six stamens each. The pistil, like the stamens, usually disappears in double flowers; but the double pæony retains it. When the reproductive organs are metamorphosed into petals, or otherwise suppressed, of course the flower produces no seed. Hence, the great majority of double-flowered plants can only be propagated by slips or offsets. Double flowers in which the stamens and pistils remain perfect, are by some persons, for distinction sake, called "multiple."

The Petunia, Datura, Azalea, and some other flowers, exhibit under cultivation another curious condition. A single extra corolla is developed, interior to the normal one, the stamens and pistil remaining perfect. This condition is popularly termed "hose-in-hose." The same term is applied to an old-fashioned variety of the polyanthus, in which the calyx assumes all the characters of the corolla, every other part of the flower remaining unaltered. Double flowers occur most frequently in families that have the stamens placed upon the receptacle. In some families, though of great extent, they never occur. Double-flowered liliaceous plants occasionally, instead of losing their stamens, increase their number!

Compound Flowers.

The preceding descriptions, as stated at the commencement, apply to Complete and Simple flowers. We will now consider the second great division, denominated "compound," and comprising such forms as the daisy, the aster, and the sun-flower. Their characters are strikingly distinct, and though occasionally found separately elsewhere, collectively they are peculiar to the family which includes the plants just mentioned, so that a description of compound flowers and a description of the Daisy-family amounts very nearly to the same thing. Save for the exceptions, the consideration of them might have been left over to the page where that family is treated of.

The first grand characteristic of compound flowers is the cohesion of their five long and slender anthers, which are united at the edges, and form a vertical tube, the upper half of the style being enclosed in it, and the stigmas alone exposed to view. The only example of such cohesion in a simple flower that from other circumstances might be mistaken for a truly compound one, is in the little plant mentioned before as the Jasione.

The second great character is, that the flowers, which are extremely minute, and called "florets" (just as the component pieces of a compound leaf take the name of "leaflets"), are collected into flat or conical cushions, surrounded by a leafy basket, which serves as a general calyx to the whole. The table-like surface on which they stand is termed the "receptacle;" and the basket, the "anthodium." The latter part is occasionally brilliant in colour, and dry and chaff-like in texture, as happens in the flowers called everlastings. The florets might at the first glance be taken for stamens, so numerous are they, and so small. But they are perfect flowers in all respects. Every one of the yellow pips forming a groundsel-blossom has its own calyx, five-lobed and tubular corolla, five stamens, and solitary pistil, and differs in no respect but that of size from a simple and regular flower of the largest dimensions. In reality there are as many simple and regular flowers, every one of them with all the parts complete, packed together in that little knob, as, with care and patience, we might reckon yellow points. The florets of compound flowers are very seldom less than ten in number; there are usually many scores, and often several hundreds. When ripe, the multitude is made plain, every ovary becoming an independent seed-like fruit, crowned with a light tuft of hairs, which enables the wind to float it away over the country. Every one has noticed the large white periwigs of the dandelion and the thistle, and how prettily the little ships sail away when blown with the breath. The marginal florets very commonly have their corollas lengthened sideways, so as to project a considerable distance beyond the edge of the basket, and give the flower the star-like appearance familiar in

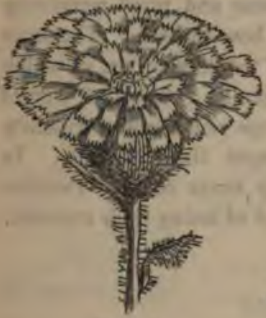

Fig. 67.

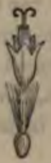

Fig. 68. Tubular floret.

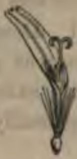

Fig. 69. Ligulate floret.

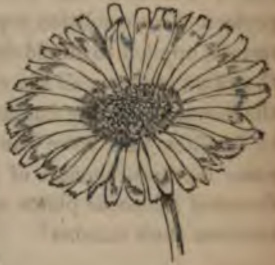

Fig. 70.

the daisy, and in the magnificent aureola of the sun-flower. (Fig. 70.) Florets thus lengthened are called "ligulate." Sometimes the whole are ligulate, as in the hawk-weed, (Fig. 67.) and sometimes the whole are of the tubular form, when the blossom presents the appearance seen in the thistle,—a purple or yellow and rayless mound. When both kinds are present, the central florets are called "florets of the disc," and the marginal ones, "florets of the ray." In the genus Centaurea a third kind of floret occurs, standing in the place of the ligulate. Here it is funnel-shaped, deeply laciniated at the upper part, and destitute both of stamens and pistil.

Compound flowers, like simple ones, are prone to become "double" under cultivation. The tubular florets of the centre or disc become changed into the ligulate condition, giving the flower much the appearance of one in which the florets are all originally ligulate. Sometimes, as in the dahlia, when thus altered, the florets assume the shape of little cups; and in China-asters, and some varieties of the daisy, they become prettily quilled. Double compound flowers seldom produce ripe seed.

Keeping these particulars before the mind, there never need be any difficulty in distinguishing between simple and compound flowers. In the single condition the latter are known by their basket of florets with united anthers; in the double condition they are told by the basket, and the resemblance of the *quasi*-petals to ray-florets, every one of them being tubular at the base. It is by no means unusual to find simple flowers densely packed together into cushion-like heads, somewhat resembling the cornucopias of the truly compound, as in thrift, the scabious, and even in clover. The two former are even surrounded by a basket, but their anthers are distinct, and stand widely apart; while in clover the corolla is like that of a pea-flower, and there is no basket underneath.

Incomplete Flowers.

While complete flowers, both simple and compound, are provided with a perianth, either single or double, and usually conspicuous and ornamental, "incomplete" flowers are destitute of this part, and occasionally have their stamens and pistils entirely unprotected, as happens in the ash-tree. The arum would be in a similar condition were it not for a special organ called a "spathe," that serves as a hood or cowl. The flowers of unisexual plants, especially unisexual trees, are almost always incomplete, the stamens being covered only by a little scale or "bract." This is the case with fir-trees, the oak, the birch, the poplar, and the water star-weed. Some incomplete flowers, owing to peculiarities in the bracts and the inflorescence are however, *in appearance*, complete and regular. This is the case with Euphorbias, especially the splendid Euphorbia Jacquiniflora, the five vermilion bracts presenting the exact similitude of a five-lobed calyx, while the extremely imperfect flowers within it appear to be stamens. It is impossible to be too much on the alert in regard to the freaks and fancies of nature; and nowhere, perhaps, are we at first more puzzled and deceived than by these wayward and pantomimic Euphorbias. Grasses and sedges, instead of calyx and corolla have the membranous coverings exemplified in the chaff of wheat, which is no other than the withered envelope of the stamens and pistil. A great distinction exists, however, between the flowers of these plants and all others that are incomplete, namely, in the position of the separate pieces of the perianth upon the stalk. Elsewhere they are disposed in *whorls*, one set concentrically within another; but in grasses the pieces stand singly and alternately, each successive piece *above* the other, and on the opposite side; close enough, nevertheless, to form a compact enclosure. In every other respect incomplete flowers agree with complete ones; that is to say, they have stamens and pistils, which (with one or two exceptions) are formed in the same way, and the functions of which are similar, and fulfilled after the same manner. Some of the noblest productions of nature have incomplete flowers; the number of tall and stately plants with flowers so formed far exceeds, indeed, that of the inconspicuous, shewing that we are by no means to confuse the idea of an *incomplete flower* with that of an *imperfect plant.*

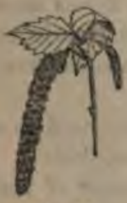

Fig. 71.
Catkins of Birch.

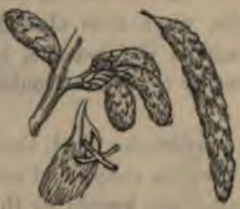

Fig. 72.
Catkins and magnified flower of Poplar.

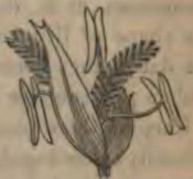

Fig. 73.
Flower of Grass (magnified).

The Inflorescence.

With the nature of the flower is intimately connected the mode of its evolution from the stem; in other words, what kind of bunch or cluster it helps to form, or if solitary, how and whereabouts it is placed. This is often exceedingly important to notice. When the individual flowers on a stem or branch are without stalks, they are said, like leaves of the same character, to be "sessile." When provided with little stalks, the latter are called "peduncles," the peduncle being analogous to the petiole of the leaf; and if the peduncles have still smaller divisions, these last are termed "pedicels."

The leafless stalk of a flower, or cluster of flowers, that rises from amid a tuft of radical leaves, as in London-pride, the cowslip, and the primrose, is termed a "scape." It *appears* to rise direct from the crown of the root, but in reality it proceeds either from the apex of a rudimentary stem, or from the axil of one of the leaves. For the tuft or rosette of leaves, though called "radical," consists in reality of a number that would have been spread over a considerable length of stem, had it been the nature of the plant to develop one. But as it is, they remain closely packed together upon the rudiment of the stem, just as we see the leaves of the larch-tree forming little sheaves through the non-development of the axis that supports them. The scapes of the tulip, hyacinth, snowdrop, and their allies, similarly ascend, not from the *root* of the plant, though such is the appearance, but from the peculiar underground bud which has already been described under the name of the "bulb," (p. 7.) and at the base of which we discover the rudimentary stem. In other words, the peduncles of flowers never proceed direct from roots; there is always some kind of intervening bud or stem.

The distribution of the flowers upon the stem is called the "inflorescence," and is of two general kinds, "solitary" and "clustered," each having several varieties. Many modifications may be present in the same family, but no plant has more than one kind. The following comprise the most usual and important forms:—

A. Flower solitary.

"Solitary and terminal," when the stem or branch bears but one blossom, and terminates in it, as happens in the Adonis and the wood-anemone.

"Solitary and axillary," when the blossoms stand singly in the axils of the leaves, as in the pansy, the pimpernel, (Fig. 78.) and the common crimson fuchsia. "Solitary flowers" may be numerous as regards the entire plant.

B. Flowers clustered.

The forms of inflorescence where the blossoms are clustered, bear special names, and are designated as follows:—

The "umbel," when many peduncles spring from the summit of the general flower-stalk, and point in all directions, every peduncle terminating in a flower, as in the onion and polyanthus. (Fig. 76.)

The "compound umbel," when the peduncles, instead of bearing flowers, support smaller umbels, called "umbellules." This kind of inflorescence is peculiar to the Parsley-family. (Fig. 75.)

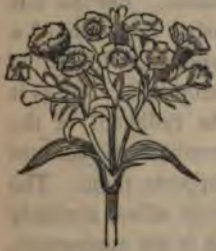

Fig. 74.
Fascicle.

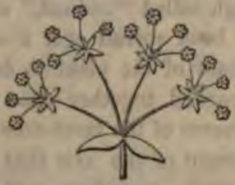

Fig. 75.
Compound umbel.

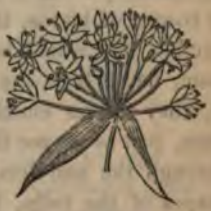

Fig. 76.
Umbel.

The "corymb," when the peduncles, instead of proceeding all from the same point, as in the umbel, spring from many different points, and form such a cluster as that of the star-of-Bethlehem. When the peduncles of a corymb are *branched*, the flowers remaining nearly upon a level, as happens in elder and hawthorn and many others, it is called a "cyme." Another variety, represented in Fig. 74, and illustrated in the sweet-william, is called the "fascicle."

The "head" resembles an umbel with the flowers all sessile, or nearly so, as in the scabious, clover, and thrift.

The "whorl," when flowers grow plentifully in the axils of opposite leaves, so as to form a seemingly unbroken ring round the stem, repeated on a smaller scale with every successive pair of leaves above. The yellow dead-nettle is a good example.

The "spike," when numerous sessile flowers are packed together in such a way as to form a long, slender, and cylindrical cluster, like that of lavender and wheat. (Fig. 79.) The spike is sometimes several feet long, as in the hollyhock and the mullein. In the Acorus Calamus, the Arum, Calla, and their congeners, the spike is consolidated into a "spadix."

The "raceme," when the flowers are borne as in the "spike," but provided with peduncles, as in the laburnum and red currant. The raceme is generally *pendulous*, and the spike generally *upright*. Racemes are occasionally a little branched, and in a few plants they are curiously coiled inwards while young, like a fern-leaf, as happens in the forget-me-not, the heliotrope, and the sundew. They are then called "circinate," or "incurved." The stalk straightens as summer advances, and the curve disappears. (Fig. 80.)

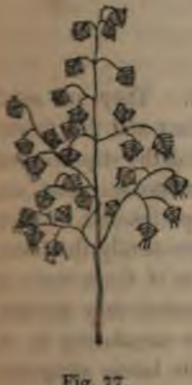
Fig. 77. Panicle of quaking-grass.

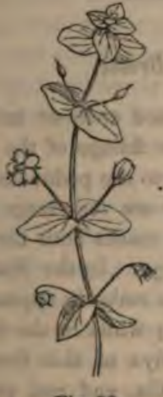
Fig. 78. "Solitary and axillary." Pimpernel.

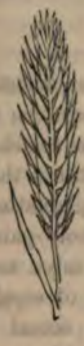
Fig. 79. Spike.

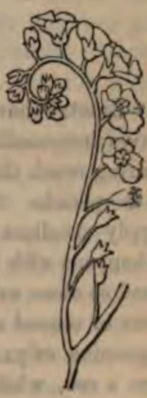
Fig. 80. Incurved raceme of forget-me-not.

The "catkin" is a kind of raceme, composed simply of bracts and stamens or pistils. Alder and birch trees furnish examples. (Figs. 71, 72.) Carices also, and the female flowers of the hop.

The "panicle" is like a raceme very much branched and subdivided, as in oats, lilac, and bunches of grapes. (Fig. 77.) When but slightly branched, the panicle is called "simple," and when very compact, as in privet, a "thyrsus."

The spike, the raceme, and the panicle often have their flowers all turned one way, looking in one direction, like the leaves of a parlour-geranium when drawn by the light. They are then said to be "unilateral," or "secund." The fox-glove and the gladiolus supply examples. All these denominations of figure and arrangement of the inflorescence, are converted into adjectives when required. For instance, "umbellate," "spicate," "racemose," signifying respectively, flowers borne in umbels, in spikes, and in racemes. It may be added that when the inmost or uppermost flowers of any of the clustered forms of inflorescence are the first to open, the term "centrifugal" is applied to it; and when the outermost or lowest open first, it is called "centripetal." Very curious and pretty examples of both kinds occur commonly. In the teasel, which has a conical head of flowers, the expansion commences half way up, so that we have a kind of equatorial zone of lilac blossoms. The expansion then goes on simultaneously at base and summit.

Bracts.

"Bracts" have been mentioned once or twice. They are small leaves intermediate between the foliage of the plant and the flower, bearing much the same relation to the peduncle that the stipules bear to the petiole. Sometimes they are very large and conspicuous, and supply excellent discriminating marks both for species and families, as happens with the fools'-parsley. In the Mallow-family the bracts stand so close to the calyx as to make it appear as if there were an outer or second series of sepals; while in the hepatica they simulate a genuine calyx, the actual calyx of this flower simulating in its turn a red, white, or blue corolla, and real petals being altogether absent. In all cases where the bracts are whorled, or regularly disposed round the stalk, so as to form anything of the nature of a cup or fence, they constitute an "involucrum." When the calyx is minute, they are often very large, compensating its absence, and protecting the flowers while young, as happens markedly in the common purple rhododendron and the Thunbergia. Here they remind us of the great stipules that compensate the absence of leaves in the Lathyrus Aphaca, &c. There are cases where the bracts emulate the petals, and are the handsomest and most highly-coloured part of the floral organism, as in the Cornus Suecica and the scarlet Euphorbias already alluded to. In the Mussænda, the clary, and the Poinsettia or coronet-spurge, they are equally remarkable for their size and resemblance to petals; and, as happens in flowers where the calyx is extraordinarily large and handsome, the corolla in these likewise is comparatively insignificant. Plants that have their flowers borne in a "spadix," generally have this part enclosed, at least while young, in a prodigious bract called a "spathe." A striking and familiar illustration occurs in the common Calla or "African-lily," the spathe of which is six or eight inches long, and resembles an alabaster vase. The flowers of the snowdrop and narcissus are also, while young, enclosed in spathes. Fig. 75 shews the bracts of the compound umbels of the Parsley-family.

THE FRUIT.

After the root, the stem, and the leaves have fulfilled their duties as stewards of the vegetable household, enlarging its fabric, and maintaining it in health and vigour;—after the flower has been put forth, and the stamens and pistils have executed their office, and the petals that were so bright and lovely have departed, and the glory seems at an end,—the grandest event of all has yet to happen, and that is the *ripening of the fruit*—the harvest-home of the spring and summer labours. The fruit or seed-pod is the final production of the plant. Everything that has preceded it has had more or less immediate reference to it, just as all the activities and aspirations of a man's social life have reference, though it may be unconsciously and undesignedly, to domestic happiness in wife and children. Well did the old poet call flowers and fruit the "joy of plants." Here, however, we are concerned with fruits as objects of practical Botany, and must leave what in other places would be a pleasant theme; reminding the student, in the first place, that the fruit is *the enlarged and perfected ovary;* and observing, that whatever the word "fruit" may signify in ordinary speech, botanically it means the seed-pod in its mature condition, whatever its substance, and whether fit to eat or not. The nature of the fruit, as to structure at least, of course depends upon that of the ovary. If the pistil be solitary, so will be the fruit; if there be many pistils, there will be many fruits; if the ovary be one-celled, in the ripe state it will be the same,—and so on with every other circumstance, though remarkable changes are sometimes superinduced. Ovaries, for example, that are composed of three or more cells, often ripen into fruits of only one cell, in consequence of the suppression of the remainder. This occurs in the coco-nut, two of the original three cells of which fruit are obliterated, but leave their vestiges in the form of scars upon the lower extremity. Sometimes the ovary ripens, but the seeds do not, as happens with Sultana raisins. The most extraordinary of these changes consist in the enormous accumulation of juice, and sugar, or acid, or starch, or oil, or whatever else forms the special characteristic of the fruit when perfected. The component cells of the fruit are called the "carpels," and the part to which the seeds are attached is named the "placenta." Fruits that burst when ripe, and let the seeds fall out, are called "dehiscent;" those that do not open, are called "indehiscent."

Fruits are sometimes so minute as to look like mere seeds, and, at the first glance, we might not unreasonably suppose them to be nothing else. It is hard to conceive, for instance, that every one of the yellow specks on the surface of a strawberry is a true and independent fruit, consisting of a matured ovary and a seed within. But such is actually the case, the crimson and juicy mound upon which they are seated being the receptacle distended with new tissue. All *flowering*-plants (except the members of the Fir-tree, the Yew-tree, and the Cycas families) are likewise truly *ovary-bearing* plants; and the illusion that some have "naked seeds," as the early botanists were wont to say, comes of the minuteness, the extreme thinness, and the close-fitting character of the ovary, and of there being generally only one seed in fruits of these tiny dimensions. Wheat, Indian-corn, barley, &c., are all of them genuine "fruits." Naked seeds, properly so called, occur only in the exceptional families just now adverted to.

Four classes of fruits have been distinguished; the classes being named and characterised as follows:—

Simple Fruits.—These come of a solitary pistil, the ovary of which consisted of a single carpel, as in the pea and larkspur. (Fig. 81.)

Collective Fruits.—These include such as originate in numerous pistils standing side by side, but not organically united. The raspberry is a good example. (Fig. 82.)

Compound Fruits.—These, the most numerous, originate in ovaries formed of many carpels organically united, as in the orange and the lily. (Fig. 83.)

Confluent Fruits.—These come of peculiar changes and cohesions of the whole mass of the inflorescence, with a result such as we see in the pine-apple. Very few are known.

The three first of these classes contain many varieties, the total number of different kinds of fruits being about forty, and the following the most important:—

The capsule,—a dry box, containing seeds more or less loose and numerous, as in the poppy-head and lily. (Fig. 83.)
The apple-form, or "pome,"—as in the apple, pear, and quince.
The berry,—exemplified in the currant and gooseberry.
The one-celled pod, or "legume,"—as in peas and beans.
The double pod, or "silique,"—as in the Cabbage-family.
The "follicle,"—as in the marsh-marigold, and many others of the Buttercup-family. (Fig. 81.)
The plum-like fruit, or "drupe,"—as in the plum and cherry.

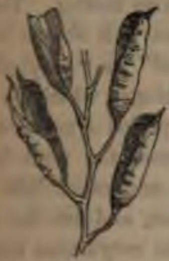
Fig. 81.
Follicles of Larkspur.

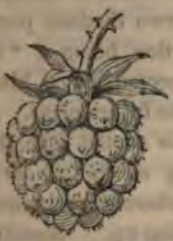
Fig. 82.
Raspberry.

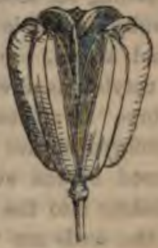
Fig. 83.
Capsule of Lily.

The "etærio,"—consisting of numerous little one-seeded fruits, placed side by side; either dry, as in the buttercup and clematis, or juicy, as in the raspberry. The hip of the rose is an *inverted* etærio. The separate carpels in clustered fruits of this description are, when dry, called "achenia;" when juicy, they are little drupes.
The "caryopsis,"—as in wheat and other grains.
The "carcerule," also resembling a seed,—as in borage, mallows, the nasturtium, and the Sage-family.
The "cypsele,"—as in the Daisy-family, again resembling a seed.
The "cremocarp,"—peculiar to the Parsley-family and the Woodruff-family.
The nut,—as in acorns and filberts.
The "hesperidium,"—as in the orange and lemon.
The cone,—produced by fir-trees, pine-trees, and the cedar.

The Seeds inherit the very life of the plant, since on being sown in the ground, and exposed to the action of moisture, warmth, and air, they germinate, and produce new plants similar to the one that ripened them. The outer skin of the seed, called the "testa," is often of some lively colour, as in French and scarlet beans, which have it variously mottled with white, purple, brown, violet, and other colours. The seeds of other plants of the Pea-family, brought from tropical countries, are remarkable for their brilliant orange-colour and scarlet, and the polished and shining surface. Seeds of many English wild-flowers are equally beautiful, though requiring the microscope for their peculiar character to be seen. Those of the Carnation-family, the poppy, and the henbane, appear as if carved and embossed with tubercles; and those of orchideous plants resemble purses made of fine net, each with a piece of money in the centre. On opening the seed, it is found to consist of white matter. This is generally resolvable into two distinct portions, as well shewn in an almond kernel, each portion being a "seed-leaf" or "cotyledon." The cotyledons are connected by a kind of hinge, which is the "embryo" or nucleus of the future plant. At the period of germination the embryo strikes a little rootlet into the ground, the testa being ruptured by the swelling of the whole mass, and often lifts the cotyledons into the air, where they become green, and are the sign that the seeds are "coming up." Sometimes the cotyledons remain in the earth, but in either case the embryo presently developes a "plumule," which is the beginning of the future stem, and soon commences to unfold little leaves. There are many seeds, however, in which the cotyledons are extremely minute, and lodged in a quantity of floury matter, which nourishes the embryo when it germinates. The purpose of the cotyledons is likewise to supply nourishment while the plant is yet too weak and tender to procure food from external sources. Hence they have been compared to the breasts of nursing mothers, and it is not difficult to see how many and close are the points of resemblance.* While fruits are often so small as to be mistaken for seeds, the latter, in their turn, are often so large as to resemble nuts and other fruits. This is the case with the seeds of the horse-chesnut, and with many that are brought as curiosities from tropical countries. There is an infallible distinction between a fruit and a seed, however much they may resemble;—the fruit always has a scar at the base, showing where it was attached to the peduncle, and another upon the summit, indicating the former presence of the style or stigma; but the seed has never more than *one* scar, indicating the point at which it was connected with the placenta of the pod that contained it, and corresponding to the mark upon the human body which anatomists call the umbilicus.

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* See the author's "Life; its Nature, Varieties, and Phenomena." Chap. xxiv. p. 305. (Ed. 2.)

We have now gone through the parts of which perfect plants are composed, and it remains but to recapitulate their names, and place them before the eye at one view:—

The parts of a Perfect Plant.

The ROOT, consisting of caudex and rootlets, which end in spongioles.
The STEM, usually dividing into branches and twigs, and generally composed of wood, bark, and pith.
The LEAVES, consisting of blade or lamina, and footstalk or petiole, and either simple, compound, or divided.
The FLOWER, consisting of
  - Calyx, formed of sepals.
  - Corolla, formed of petals.
  - Stamens, formed of filament and anther, the latter containing pollen.
  - Pistil, formed of
    - Ovary, containing ovules, or rudimentary seeds.
    - Style.
    - Stigma.

The FRUIT, or ripened ovary, containing Seeds.

IMPERFECT PLANTS.

"Imperfect Plants" are those in which the grand feature of the "perfect" division, namely, the blossom, is either absent or developed in a manner so entirely different as to have gained for them the name of "flowerless." No plants are absolutely destitute of seed-producing or reproductive powers; nor, judging from philosophical analogy, of that wonderful two-fold principle which has its highest manifestation in male and female. But there are many imperfect plants in which it is extremely difficult to make out how and whereabouts the reproductive power is effectuated, the apparatus found in perfect plants being represented very faintly even in the highest. Linnæus well gave them the appropriate name of Cryptogamia, literally "hidden-flowered." Flowerless plants seldom develop stems; the greater part are low-growing and inconspicuous, consisting merely of leafy organs, and often of nothing more than crust-like, or spongy, or thready, or fibrous matter, and, at the lowest point, of no more than a few microscopic cells of coloured fluid. In our own country, their noblest representatives are the Ferns, those charming plants that grace every wood and shady bank with green luxuriance of arching plumes, and are so curious in the brown spangles of their under surface. A particular account of the whole of the flowerless plants will come on by and by, under special heads; here it is sufficient to point to the fern, the common mushroom, and the black tangles left on the shore by the retiring tide, as supplying fair ideas of their diversified and extraordinary aspects.

Imperfect or flowerless plants must be distinguished most carefully from perfect ones which have merely *incomplete blossoms*, such as grasses, and most English forest-trees. Every plant that at any time produces true stamens and pistils, however inconspicuous, belongs to the "perfect" division; it is the want of these parts, at all times, that negatively marks the "flowerless." The "fructification" of the latter, though deficient in these important organs, is often much more beautiful than that of many flowering-plants, as happens in various Lichens and Fungi. Flowerless plants, in their higher families, have organs *analogous* to stamens and pistils, as will be described in the proper place, but they cannot be discerned without a powerful microscope. In contradistinction to the Cryptogamia, flowering plants are sometimes called Phænogamia, and also Phanerogamia, literally "visible-flowered."

CLASSIFICATION.

No department of Botany is more urgently important than Classification. The quantity of plants to be dealt with is so vast, that until in some measure classified, if only in theory, there can be nothing but confusion and bewilderment. The pressing consciousness of the need of classification, in the early days of Botany, originated scores of different schemes intended to meet it; and so intimately is sound and philosophical Botany identified with a correct arrangement of plants according to their affinities, that nature's own plan, or the "Natural System," has been from the beginning, with every genuine botanist, the paramount object of research. Tournefort, a famous Frenchman, constructed an ingenious system dependent on the shape of the flower; other botanists tried to make the leaves and the fruits serve the purpose they had in view. Linnæus, who first gave solidity and coherence to botanical knowledge, skilfully took the stamens and pistils, and contrived a method which, though purely artificial, has made his name illustrious for ever, so successful was it in removing the difficulties of the agè, and giving that precision and facility to botanical investigations, to which the present high position of the science of Botany is mainly owing. In the present volume we proceed upon the *Natural System*, or that which arranges plants into their families, seeing that it is now sufficiently determined for practical purposes, and is much more solidly useful and instructive than the Linnæan, both at the beginning and continuously, since the former only takes us to a certain point, and has then no more to offer.

Classification by the Natural System begins with the separation of plants into the two grand divisions described above, and called "Perfect" and "Imperfect." Each of these great divisions is resolved into two classes, called "primary;" each of the classes into "sections," and the sections into "alliances," from which we move forwards to the "families." The family, after the same manner, consists of "genera," and every "genus" of a less or greater number of "species," which are represented by thousands and millions of individuals. It is much the same as in geography, where we first have continents, then countries, then provinces, then parishes, then towns, streets, houses, and inhabitants.

On a very slight acquaintance with flowering-plants, it is discovered that some possess *net*-veined leaves, and the remainder straight or *parallel*-veined; further, that when the leaves are net-veined, the parts of the flower are in *fives* or *fours*, and when parallel-veined, in *threes*. Further again, that the stems of the net-leaved plants are composed of distinct bark, wood, and pith; while in the parallel-veined there is no such distinction, the woody portion being commingled with the pithy, and true bark entirely wanting; and lastly, that the seeds of the net-leaved plants contain *two* embryo leaves, which, at the period of germination, usually lift themselves above the ground, and spread horizontally; while those of the parallel-veined contain but *one* leaf, which, at germination, shoots up vertically, like a blade of sprouting corn. However trifling the two sets of characters may appear when stated in words, they are exponents of a thorough difference in every particular, both of structure and aspect. The two classes which they mark are called respectively Exogens and Endogens, the names referring proximately to the mode in which the stem increases in substance and solidity, every plant that bears a flower belonging to one or the other, and plainly declaring which.

By some botanists they are called "Dicotyledones" and "Monocotyledones," — these latter names referring to the differences in the structure of the seed. True, there are in both classes departures from the typical structure; and individuals, and sometimes entire families, curiously mimic the shapes of the other; but on the whole, the peculiar characters are constant and prominent, or at least sufficiently plain for practical purposes. One part or another is always in the front. If the leaves fail to shew whether the plant be an Exogen or an Endogen, it is told by the flower; and if the flowers refuse to speak, it is told by the stem or seed. It is best always to look first, if possible, at the *flowers*, as Exogens often have very narrow leaves, or very succulent ones, in which the veins scarcely appear. Many little distinctive marks, over and above the essential ones, assist the eye in determining whether a plant be Exogen or Endogen; the leaves, for example, of Exogens, detach themselves bodily from the stem, when dead, and leave a scar, whereas the leaves of Endogens wither away without falling, and the stem retains their stumps. With the aid of the diagram opposite, the differences of the two classes will readily be understood.

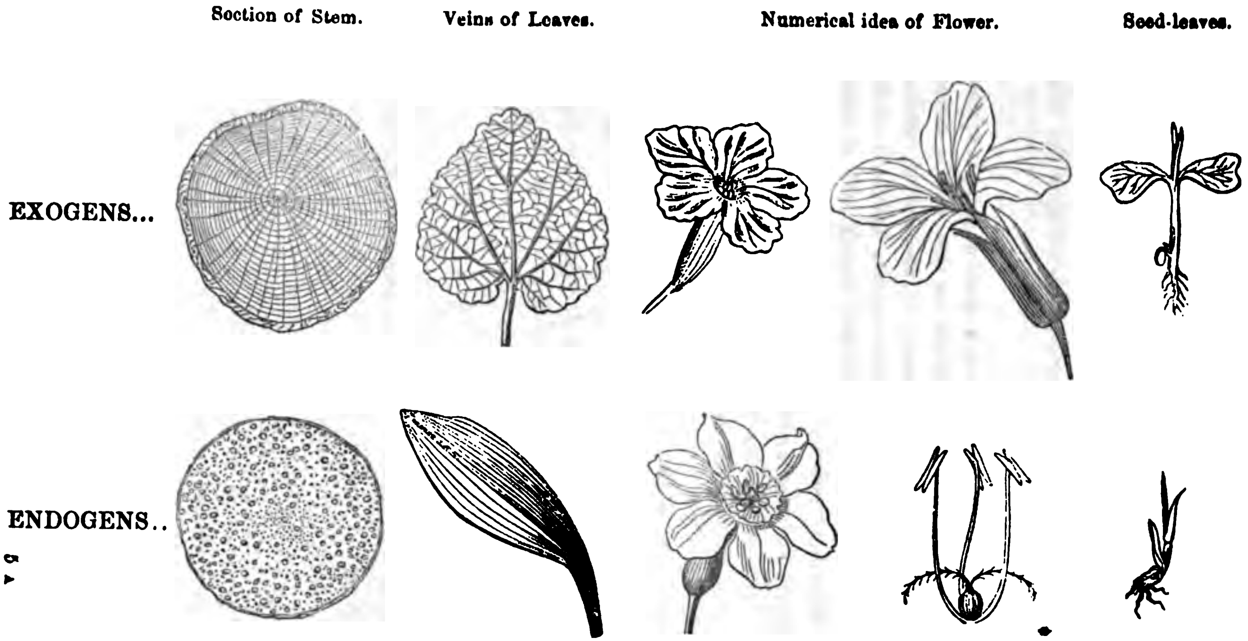
EXOGENS.

Exogens comprehend by far the larger portion of flowering-plants, though several of the most important and extensive families belong to the ranks of the Endogens. Every diversity of configuration occurs among them, and every variety of size. There are scattered up and down their various tribes, rootless plants, stemless plants, leafless plants, and in not a few there are neither calyx nor corolla. The whole are susceptible, nevertheless, of distribution into

Exogens with *Bisexual* flowers, and
Exogens with *Unisexual* flowers.

Bisexual Exogens.—While most flowering-plants are Exogens, most of the latter are bisexual. How to classify these becomes the next consideration, and a seriously important one, since the families are very numerous; while in regard to the grand preliminary groups which undoubtedly they are referable to, Nature has refused to disclose her plan with perspicuity. The beginning and the ending are made plain, but the space lying between is half-hidden. One school of botanists resolves them into such as possess both calyx and corolla,

STRUCTURAL DIFFERENCES OF EXOGENS AND ENDOGENS.



or "Dichlamydeæ," and such as have calyx only, or "Monochlamydeæ," throwing the former into three sub-divisions, viz.:—

1. Thalamifloræ: Petals unconnected, and seated, along with the stamens, upon the receptacle.
2. Calycifloræ: Petals and stamens seated upon the calyx.
3. Corollifloræ: Petals combined, seated upon the receptacle, and bearing the stamens.

The arrangement is meritorious, without doubt. It appears, however, neither so natural nor so eligible as that which, disregarding the uncertain distinction of presence or absence of corolla, takes the peculiarities of the reproductive organs, described on page 30, and disposes the whole of the families simply and at once under the three following heads:—

Perianth *enclosing* the ovary, both calyx and corolla being removable without touching it; the stamens standing upon the receptacle, and thus as free and independent as the ovary. (Fig. 84.)

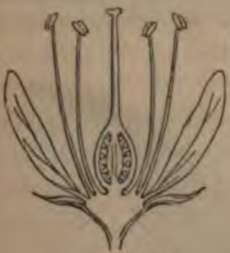


Fig. 84.
Hypogynous stamens.

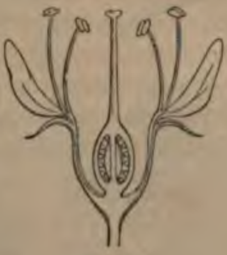


Fig. 85.
Perigynous stamens.

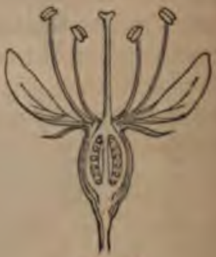


Fig. 86.
Epigynous stamens.

Perianth and ovary as in the first section, but the stamens attached either to the calyx or to the corolla. (Fig. 85.)

Perianth and stamens growing upon the *summit* of the ovary. Not that they are absolutely generated there, but that the lower portions are intimately adherent to the surface of the ovary, as explained on page 28. (Fig. 86.)

No special names have been given to these three groups; they are simply called Hypogynous Exogens, Perigynous Exogens, and Epigynous Exogens.

This latter scheme recommends itself by bringing together much larger numbers of related families than are found in proximity under the other; it prepares the way likewise for their being marshalled into sets of half-a-dozen or so, that can be pleasantly taken in at a bird's-eye view, an advantage which in the former scheme cannot be so well realised. There is this great advantage also about it,—the exceptions to the grand distinctive characters are comparatively few, whereas in the other scheme they are numerous. Many plants, for example, in affinities dichlamydeous, have no corolla, and many more have no perianth whatever. On the other hand, by the latter of the two schemes, whortleberries are dissociated from the heaths, and Cucurbitaceæ from the passion-flowers, because of the different position of the ovary, though in other respects there is intimate relationship; while the Epacris, which has its stamens upon the corolla, is, nevertheless, connected with and included among the hypogynous families. Anomalies and inconsistencies such as these are part of the very nature of things, and render it utterly impossible to construct classes, and to frame definitions, that shall be mathematically exact, and contain nothing but what they profess to. When we quit our chairs and go to nature, we find our ingenious fences broken down—our carefully-drawn lines of demarcation vague and unreal—the utmost we can hope to accomplish in classification is to associate things round certain typical and central ideas, sufficiently well for practical purposes; and we may deem ourselves fortunate in the degree that the exceptions to those central ideas are fewer and less embarrassing.

Unisexual Exogens.—These comprise only about a dozen families of importance, and need no preliminary analysis. It is important, however, to remember that truly unisexual plants are such as have the two kinds of reproductive organs, stamens and pistils, always apart and distinct, and the inflorescence and the perianth usually of different character in each of the sexes, intimating at a glance which is which, after the manner of human dress. Plants which are unisexual only by the non-development of either stamens or pistil, such as the common red lychnis, are, in classification, always associated with their immediate kindred, and regarded simply as exceptional to the family structure.

ENDOGENS.

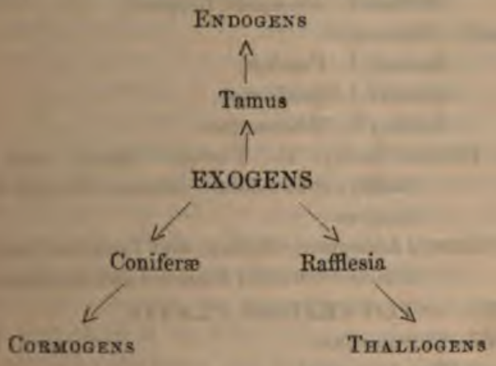
Endogens comprise all plants of the grass kind, together with sedges, rushes, and the choice tribes represented in the hyacinth, the orchis, and the lily. In hot countries, their circle is widened by the glorious palm-trees, well called by Linnæus, the "Princes of the Vegetable

Kingdom," and which, with a few exceptions, also tropical, are the only arborescent members of the class. Except in green-houses, we never see endogenous Trees in England; and even the captives in our conservatories, with all their green and beautiful aspiration, give but a faint idea of the dignity of Endogens as they are in the Indies. Endogens are resolvable into three principal sections. Those of the first section have complete and usually brilliant flowers, and are called "Petaloid;" those of the second section have their flowers disposed in a "spadix," with a "spathe" around it, and are called "Spadiceous;" those of the third are incomplete and chaff-like, and are termed "Glumaceous." Endogens also include some plants of extremely low organisation, not practically referable to any one of the three general sections, such as the Lemna or duckweed; and also some plants with extremely incomplete flowers, such as the club-rush or Typha. These are technically "spadiceous," and are placed in the second section.

FLOWERLESS or imperfect plants present themselves, like the nobler half of botanical nature, under two principal aspects. The species are innumerable; they belong, however, to very few distinct families. The higher forms comprise ferns, mosses, liverworts, the plants called Lycopodium and Selaginella, and the antique "horsetails" or Equiseta; and from the circumstance of their possessing leafy organs, and more or less of an upright stem or stalk, with veins and woody fibres in it, are distinguished, technically, as CORMOGENS. The lower forms comprise sea-weeds, lichens, fungi, or mushrooms and toadstools of all kinds, also the hair-like Confervæ of fresh water, and some other singular productions. As a whole, they are rarely green, and never produce stem or leaves, consisting of little more than masses of cellular matter, though the figures are often remarkably beautiful and symmetrical. An entirely new world is opened among them by the microscope, which reveals shapes and phenomena of inexpressible wonder. They are collectively called THALLOGENS.

But while separated so decidedly in type or central plan, these four great classes, Exogens, Endogens, Cormogens, and Thallogens, are not exact and rigid in their *boundaries*. There are many curious plants which stand intermediately between them, giving a hand to each, and thus linking the whole into one grand confraternity. The Paris or true-love, the pretty American Trilliums, the Smilax-family, the lovely Lapageria rosea, and the Tamus, which festoons the autumn hedges with vegetable coral, unite the Exogens to the Endogens; fir-trees touch both Exogens and Cormogens; and midway between the Exogens and the Thallogens stand some extraordinary parasitic plants, having the substance of a mushroom, but the ordinary characters of the flowers of the former. Intermediates of similar nature connect every subordinate class and family, locking all together in reciprocal affinity.

These things plainly shew how futile must be attempts to put the objects of the vegetable kingdom in a line, beginning with the noblest, and ending with the humblest. And yet this has been the aim and cherished fancy of many men who, captivated by the ancient and sonorous suggestion of a universal "chain of nature," have thought labour alone was necessary to arrange everything in exact sequence. There is no such line in nature. It is easy to pick out plants that can be placed in lineal order, but thrice as many must be omitted as incompatible. The true relation which the four great primary classes bear to one another is represented in the following diagram, wherein are introduced also the names of the principal intermediates:—



Exogens, as comprising the most highly developed plants, occupy the central position, and at equal distances stand the Endogens, Cormogens, and Thallogens, with their respective intermediates between. Everything stands pretty near to its related forms; and if we think of the noblest Exogen as the heart of a solid sphere, over the surface of which are diffused the lowest kinds of Endogens and of imperfect plants, the successively nobler lying below and filling up the space, we may conceive how things stand related in actual fact, and how every plant has affinities on all sides. That this is the correct and philosophical view of the matter, is shown at length in the author's work named at foot, wherein also are copious illustrations from the analogies of the Animal Kingdom.*

But on paper we must needs proceed in a straight line, taking things in the most natural succession that the exigencies of the pen will permit. In the present volume, accordingly, the classes and their families will be described in the order in which they have been mentioned, and of which the following table is a summary:—

PERFECT, or FLOWERING PLANTS.
- Class 1. EXOGENS.
  - Secton 1. *Bisexual Exogens.*
    - Group 1. Ovary free inside the perianth; stamens upon the receptacle. (Fig. 84.)
    - Group 2. Ovary free inside the perianth; stamens upon the calyx or corolla. (Fig. 85.)
    - Group 3. Perianth adherent to the ovary, and, along with the stamens, apparently upon the summit of it. (Fig. 86.)
  - Section 2. *Unisexual Exogens.*
- Class 2. ENDOGENS.
  - Section 1. *Petaloid.*
  - Section 2. *Spadiceous.*
  - Section 3. *Glumaceous.*
- The Fir-tree family, the Yew-tree family, and the Cycas family, intermediate between Exogens and Cormogens.
- The Tamus, Lapageria, Smilax, and True-love families, intermediate between Exogens and Endogens.

IMPERFECT, or FLOWERLESS PLANTS.
- Class 3. CORMOGENS.
- Class 4. THALLOGENS.

Some authors prefer to commence with the lowest forms, or Thallogens, and proceed from the simple to the complex. In practice it is better to take the most intelligible objects in the first place, beginning with those in which every member is plainly distinguishable, and in which every function is performed by a special organ, moving gradually from these to the humble forms in which organs disappear, and functions are no longer distributed. In studying Zoology, it is found best to begin with Man, and move downwards to the animalcule, and a similar course is the most practical in regard to Botany.

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* "Life; its Nature, Varieties, and Phenomena." Chap. xxix. p. 342. (Ed. 2.)

THE FAMILIES OF PLANTS.

A family of plants comprehends all those in a given class and section which are intimately alike in general structure, and usually bear a striking outward likeness in addition. The members are referable, for the most part, to some well-marked vegetable type, and seem to cluster, as to their characters, round a particular form which concentrates the natures of all. This central or concentrative form is used as the *name* for the family. The "Buttercup-family" is that of which the buttercup is representative; the "Cabbage-family," that of which the garden-cabbage is the type, and so with all the others. Every family has its Latin or technical name as well as its English one, and for the most part this is founded, like the English name, upon the Latin term for the principal representative. For example, the buttercup being in Latin called *Ranunculus*, the Buttercup-family is named *Ranunculáceæ;* and the water-lily being in Latin *Nymphæa*, the Waterlily-family is *Nymphæáceæ*. The termination *áceæ* marks the names of the families in almost every instance, and some botanists employ it universally. The exceptions occur in the names of the Pea-family or *Leguminósæ;* the Parsley-family, or *Umbelliferæ;* the Daisy-family or *Compositæ*, and a few others in which some striking particular of structure furnishes a still more appropriate name than is supplied even by the representative or central member. Many botanists call the families "Natural Orders,"—a translation of the Latin "Ordines Naturales." The exact *boundaries* of the several families are often somewhat uncertain, because on the confines they are prone to mingle, like the natives of contiguous countries. For the true idea of them we must look, accordingly, to the *centre*, finding that centre by the name, and determining them not so much by what they strictly *ex*clude, as by what they obviously and unmistakeably *in*clude. But it must not be thought that all the members of a family resemble the typical one in colour, bulk, and stature. Trees and herbaceous plants, land-plants and aquatics, may all be comprised in a single family; differences of size, colour, and place of growth being circumstances compatible with completest resemblance as to essentials. Nor must it be supposed that all plants can be referred off-hand to their proper families. The affinities of many are very difficult to determine—so that, by different authors, the same plant is often placed in a different family. Such discord will of course cease, or at least diminish, in course of time, according as the true affinities of plants are ascertained, as well illustrated in the case of the Parnassia, which by some writers has been associated with the sundews, by others with the St. John's-worts, but which is now seen to be in reality one of the Saxifrage-family. One of the chief ends and objects of Botany is the determination of the affinities of plants, and consequently until every plant in the world shall be perfectly well understood, as regards its form, botanists must needs be perplexed, and the history of the Parnassia have many parallels: in other words, we must not expect to perceive on the instant what can be possessed only as the reward of the diligence and study of generations. All the great and important families are, however, known and clearly defined, and the number of *common* plants that are as yet ill-understood is very small indeed. The concurrence as to general properties among the members of a family was mentioned some pages back. There is an agreement also in the very nature of the sap. Trees of the same family graft readily with one another, but those of *different* families are indisposed to unite, even if they do not absolutely refuse, shewing at once which of a large company are aliens, and which have real affinity. The plants of the Ash-tree-family and those of the Jessamine-family were once thought nearly related; but although the former are somewhat heterogeneous, they graft readily on each other's branches, while the latter, which they resemble superficially, refuse to combine with them.

The families of plants vary greatly in extent. Some contain but half-a-dozen species; others many thousands; their own numbers, so far as ascertained, being about 300. Botanists differ, however, a good deal as to the amount of divergence from the central or typical idea which shall still be considered compatible with it. Some are for excessive synthesis; others for excessive analysis. The Geranium-family, with the former, includes the wood-sorrels, nasturtiums, and flax; but with the latter, these plants are representatives of a corresponding number of distinct and separate families. For the purposes of students, it is better, perhaps, that such plants should be regarded as forming many small families rather than one great family, since if things be massed too much together, the tendency is to render enquiry superficial, and to neutralize the characters, by multiplying the exceptions. Families are seldom confined to a single country, usually spreading all over the world, though more plentifully in some latitudes than others, according as they are fond of heat or cold. Most are represented in the tropics, but some are almost entirely extra-tropical. It is curious to see how families eminently belonging to warm countries, such as the Malvaceæ, creep, in a few species, into cold ones, like beams of light stretching faintly into distant darkness, as if they would invite us to visit the realms of their magnificence.

ALLIANCES.

"Alliances" are sets of families, not exceeding half a dozen or so, that strongly resemble one another in several leading points. They are much more difficult of determination than the families themselves, since the resemblances are often such as considerable practice will alone enable the student to appreciate. It is better, accordingly, to leave the study of them until the characters, in all their variableness, of the families shall have been pretty well mastered, and the way be prepared for apprehending the niceties and minutiæ on which they depend. Lindley's "Vegetable Kingdom" may then be taken as the text-book. The names of the alliances invariably end in *alës*, and are formed from those of the principal families which they severally include, or from some central and typical plant: Ranales, for instance, from Ranunculaceæ; Daphnales, from Daphne.

In the following list are included all the alliances and their component families which have indigenous representatives in Great Britain; and all the exotic ones that are of importance and practical interest to British botanists. Many more *families* have been discriminated, but the plants comprising them are few in number, and are either scarcely known, except in great herbariums, or of such rare occurrence in gardens and conservatories as not to come within the scope of a work proposing to deal only with what is native, popular, and ordinarily cultivated. The "Vegetable Kingdom" must be consulted for particulars respecting them, should the student wish to pile up book-knowledge of what he is not likely to see living. A somewhat different sequence will be followed in the descriptive accounts of the several families, to be given by-and-bye, on account of certain exigencies connected with the printing. This, however, will be provided for in the alphabetical Index at the end of the book. The object here is to shew at one view how they stand related. The principal families, or those to which the student should give his first and keenest consideration, are printed in capitals, and all but those which are marked with an asterisk *, have indigenous representatives in the British islands.

LIST OF THE ALLIANCES AND FAMILIES.

CLASS I.—EXOGENS.

SECTION 1.—BISEXUAL EXOGENS.

GROUP 1.—*Ovary free within the Perianth; Stamens growing upon the Receptacle.* (*Hypogynous.*)

VIOLALES.

English Name.	Latin Name.
*Passion-flower Family	*Passifloraceæ.*
Violet "	..*Violaceæ.*
Frankenia "	..*Frankeniaceæ.*
Tamarisk "	..*Tamaricaceæ.*
Stonecrop "	..*Crassulaceæ.*

CISTALES.

Cistus Family	..*Cistaceæ.*
CABBAGE "	..*Cruciferæ.*
Mignonette "	..*Resedaceæ.*
*Caper "	..*Capparidaceæ.*

MALVALES.

*Byttneria Family	..*Byttneriaceæ.*
*Trophy-wort "	..*Tropæolaceæ.*
MALLOW "	..*Malvaceæ.*
Lime-tree "	..*Tiliaceæ.*

SAPINDALES.

*Tetratheca Family	..*Tremandraceæ.*
Milk-wort "	..*Polygalaceæ.*
Bladder-nut "	..*Staphyleaceæ.*
*Horse-chesnut "	..*Sapindaceæ.*
Maple "	..*Aceraceæ.*
*Malpighia "	..*Malpighiaceæ.*

GUTTIFERALES.

*Camellia Family	..*Ternströmiaceæ.*
St. John's-wort "	..*Hypericaceæ.*

NYMPHALES.

Water-lily Family	..*Nymphæaceæ.*
*Nelumbium "	..*Nelumbiaceæ.*

RANALES.

*Magnolia Family	..*Magnoliaceæ.*
*Dillenia "	..*Dilleniaceæ.*
BUTTERCUP "	..*Ranunculaceæ.*
*Sarracenia "	..*Sarraceniaceæ.*
POPPY "	..*Papaveraceæ.*

BERBERALES.

English Name.	Latin Name.
Sundew Family	..*Droseraceæ.*
Fumitory "	..*Fumariaceæ.*
Berbery "	..*Berberidaceæ.*
*Grape-vine "	..*Vitaceæ.*
*Sollya "	..*Pittosporaceæ.*

ERICALES.

*Epacris Family	..*Epacridaceæ.*
Winter-green "	..*Pyrolaceæ.*
Monotropa "	..*Monotropaceæ.*
HEATH "	..*Ericaceæ.*

RUTALES.

*Orange Family	..*Aurantiaceæ.*
*Melia "	..*Meliaceæ.*
*Sumach "	..*Anacardiaceæ.*
*RUE "	..*Rutaceæ.*
*Ailantus "	..*Xanthoxylaceæ.*
Elatine "	..*Elatinaceæ.*

GERANIALES.

Flax Family	..*Linaceæ.*
Woodsorrel Family	..*Oxalidaceæ.*
Touch-me-not "	..*Balsaminaceæ.*
Geranium "	..*Geraniaceæ.*

SILENALES.

CARNATION Family	..*Caryophyllaceæ.*
Illecebrum "	..*Illecebraceæ.*
Purslane "	..*Portulacaceæ.*
RHUBARB "	..*Polygonaceæ.*

CHENOPODALES.

*Marvel-of-Peru Family	*Nyctaginaceæ.*
*Rivina "	..*Phytolaccaceæ.*
Amaranth "	..*Amarantaceæ.*
Spinach "	..*Chenopodaceæ.*

GROUP 2.—*Ovary free within the Perianth; Stamens growing upon the Calyx or Corolla.* (*Perigynous.*)

English Name.	Latin Name.
FICOIDALES.	
•Ice-plant Family	..*Mesembryaceæ.*
Scleranthus "	..*Scleranthaceæ.*
DAPHNALES.	
MEZEREON Family	..*Thymelaceæ.*
•PROTEA "	..*Proteaceæ.*
•Bay-tree "	..*Lauraceæ.*
ROSALES.	
•Calycanthus Family	*Calycanthaceæ.*
PEA "	..*Leguminosæ.*
PLUM "	..*Drupiferæ.*
APPLE "	..*Pomiferæ.*
Lady's-mantle "	..*Sanguisorbaceæ.*
ROSE "	..*Rosaceæ.*
SAXIFRAGALES.	
SAXIFRAGE Family	..*Saxifragaceæ.*
•Hydrangea "	..*Hydrangeaceæ.*
•Cunonia "	..*Cunoniaceæ.*
Lythrum "	..*Lythraceæ.*
RHAMNALES.	
Elm-tree Family	..*Ulmaceæ.*
Buckthorn "	..*Rhamnaceæ.*
Spindle-tree "	..*Celastraceæ.*
•Halesia "	..*Styracaceæ.*
GENTIANALES.	
Holly Family	..*Aquifoliaceæ.*
PERIWINKLE Family	..*Apocynaceæ.*
Tooth-wort "	..*Orobanchaceæ.*
GENTIAN "	..*Gentianaceæ.*

English Name.	Latin Name.
SOLANALES.	
LILAC Family	..*Oleaceæ.*
POTATO "	..*Solanaceæ.*
•Wax-flower "	..*Asclepiadaceæ.*
Convolvulus "	..*Convolvulaceæ.*
Dodder "	..*Cuscutaceæ.*
Phlox "	..*Polemoniaceæ.*
CORTUSALES.	
•Nemophila Family	..*Hydrophyllaceæ.*
Thrift "	..*Plumbaginaceæ.*
Ribwort "	..*Plantaginaceæ.*
PRIMROSE "	..*Primulaceæ.*
•Ardisia "	..*Myrsinaceæ.*
ECHIALES.	
A.—Flowers regular.	
•Jessamine Family	..*Jasminaceæ.*
•Heliotrope "	..*Ehretiaceæ.*
•Nolana "	..*Nolanaceæ.*
BORAGE "	..*Boraginaceæ.*
B.—Flowers irregular.	
SAGE Family	..*Labiatæ.*
Verbena "	..*Verbenaceæ.*
•Selago "	..*Selaginaceæ.*
BIGNONIALES.	
•Gloxinia Family	..*Gesneraceæ.*
•Bignonia "	..*Bignoniaceæ.*
•JUSTICIA "	..*Acanthaceæ.*
FOXGLOVE "	..*Scrofulariaceæ.*
Butterwort "	..*Lentibulariaceæ.*

GROUP 3.—*Perianth and Stamens upon the summit of the Ovary.* (*Epigynous.*)

CAMPANALES.	
Campanula Family	..*Campanulaceæ.*
Lobelia "	..*Lobeliaceæ.*
•Goodenia "	..*Goodeniaceæ.*
•Stylidium "	..*Stylidiaceæ.*
VALERIAN "	..*Valerianaceæ.*
Scabious "	..*Dipsacaceæ.*
DAISY "	..*Compositæ.*
MYRTALES.	
•Combretum Family	*Combretaceæ.*
•Fringe-myrtle "	*Chamælauciaceæ.*
Water Featherweed "	*Halorageaceæ.*
FUCHSIA "	*Onagraceæ.*
•Melastoma "	*Melastomaceæ.*
•MYRTLE "	*Myrtaceæ.*
CACTALES.	
•Chili-nettle Family	..*Loasaceæ.*
•CACTUS "	..*Cactaceæ.*

GROSSALES.	
CURRANT Family	..*Grossulaceæ.*
•Escallonia	..*Escalloniaceæ.*
•Mock-orange	..*Philadelphaceæ.*
CINCHONALES.	
Whinberry Family	..*Vacciniaceæ.*
•COFFEE-TREE "	..*Cinchonaceæ.*
Honeysuckle "	..*Caprifoliaceæ.*
WOODRUFF "	..*Galiaceæ.*
UMBELLALES.	
PARSLEY Family	..*Umbelliferæ.*
Ivy "	..*Araliaceæ.*
Dogwood "	..*Cornaceæ.*
ASARALES.	
Sandal-wood Family	*Santalaceæ.*
Mistleto "	..*Loranthaceæ.*
Birthwort "	..*Aristolochiaceæ.*

LIST OF THE ALLIANCES AND FAMILIES.

CLASS I.—EXOGENS.

SECTION 1.—BISEXUAL EXOGENS.

GROUP 1.—*Ovary free within the Perianth; Stamens growing upon the Receptacle.* (*Hypogynous.*)

VIOLALES.

English Name.	Latin Name.
•Passion-flower Family	*Passifloraceæ.*
Violet "	*Violaceæ.*
Frankenia "	*Frankeniaceæ.*
Tamarisk "	*Tamaricaceæ.*
Stonecrop "	*Crassulaceæ.*
CISTALES.	
Cistus Family	*Cistaceæ.*
CABBAGE "	*Cruciferæ.*
Mignonette "	*Resedaceæ.*
•Caper "	*Capparidaceæ.*
MALVALES.	
•Byttneria Family	*Byttneriaceæ.*
•Trophy-wort "	*Tropæolaceæ.*
MALLOW "	*Malvaceæ.*
Lime-tree "	*Tiliaceæ.*
SAPINDALES.	
•Tetratheca Family	*Tremandraceæ.*
Milk-wort "	*Polygalaceæ.*
Bladder-nut "	*Staphyleaceæ.*
•Horse-chesnut "	*Sapindaceæ.*
Maple "	*Aceraceæ.*
•Malpighia "	*Malpighiaceæ.*
GUTTIFERALES.	
•Camellia Family	*Ternströmiaceæ.*
St. John's-wort "	*Hypericaceæ.*
NYMPHALES.	
Water-lily Family	*Nymphæaceæ.*
•Nelumbium "	*Nelumbiaceæ.*
RANALES.	
•Magnolia Family	*Magnoliaceæ.*
•Dillenia "	*Dilleniaceæ.*
BUTTERCUP "	*Ranunculaceæ.*
•Sarracenia "	*Sarraceniaceæ.*
POPPY "	*Papaveraceæ.*

BERBERALES.

English Name.	Latin Name.
Sundew Family	*Droseraceæ.*
Fumitory "	*Fumariaceæ.*
Berbery "	*Berberidaceæ.*
•Grape-vine "	*Vitaceæ.*
•Sollya "	*Pittosporaceæ.*
ERICALES.	
•Epacris Family	*Epacridaceæ.*
Winter-green "	*Pyrolaceæ.*
Monotropa "	*Monotropaceæ.*
HEATH "	*Ericaceæ.*
RUTALES.	
•Orange Family	*Aurantiaceæ.*
•Melia "	*Meliaceæ.*
•Sumach "	*Anacardiaceæ.*
•RUE "	*Rutaceæ.*
•Ailantus "	*Xanthoxylaceæ.*
Elatine "	*Elatinaceæ.*
GERANIALES.	
Flax Family	*Linaceæ.*
Woodsorrel Family	*Oxalidaceæ.*
Touch-me-not "	*Balsaminaceæ.*
Geranium "	*Geraniaceæ.*
SILENALES.	
CARNATION Family	*Caryophyllaceæ.*
Illecebrum "	*Illecebraceæ.*
Purslane "	*Portulacaceæ.*
RHUBARB "	*Polygonaceæ.*
CHENOPODALES.	
•Marvel-of-Peru Family	*Nyctaginaceæ.*
•Rivina "	*Phytolaccaceæ.*
Amaranth "	*Amarantaceæ.*
Spinach "	*Chenopodaceæ.*

GROUP 2.—*Ovary free within the Perianth; Stamens growing upon the Calyx or Corolla. (Perigynous.)*

English Name.	Latin Name.
FICOIDALES.	
•Ice-plant Family	..*Mesembryaceæ.*
Scleranthus "	..*Scleranthaceæ.*
DAPHNALES.	
MEZEREON Family	..*Thymelaceæ.*
•PROTEA "	..*Proteaceæ.*
•Bay-tree "	..*Lauraceæ.*
ROSALES.	
•Calycanthus Family	*Calycanthaceæ.*
PEA "	..*Leguminosæ.*
PLUM "	..*Drupiferæ.*
APPLE "	..*Pomiferæ.*
Lady's-mantle "	..*Sanguisorbaceæ.*
ROSE "	..*Rosaceæ.*
SAXIFRAGALES.	
SAXIFRAGE Family	..*Saxifragaceæ.*
•Hydrangea "	..*Hydrangeaceæ.*
•Cunonia "	..*Cunoniaceæ.*
Lythrum "	..*Lythraceæ.*
RHAMNALES.	
Elm-tree Family	..*Ulmaceæ.*
Buckthorn "	..*Rhamnaceæ.*
Spindle-tree "	..*Celastraceæ.*
•Halesia "	..*Styracaceæ.*
GENTIANALES.	
Holly Family	..*Aquifoliaceæ.*
PERIWINKLE Family	..*Apocynaceæ.*
Tooth-wort "	..*Orobanchaceæ.*
GENTIAN "	..*Gentianaceæ.*

English Name.	Latin Name.
SOLANALES.	
LILAC Family	..*Oleaceæ.*
POTATO "	..*Solanaceæ.*
•Wax-flower "	..*Asclepiadaceæ.*
Convolvulus "	..*Convolvulaceæ.*
Dodder "	..*Cuscutaceæ.*
Phlox "	..*Polemoniaceæ.*
CORTUSALES.	
•Nemophila Family	..*Hydrophyllaceæ.*
Thrift "	..*Plumbaginaceæ.*
Ribwort "	..*Plantaginaceæ.*
PRIMROSE "	..*Primulaceæ.*
•Ardisia "	..*Myrsinaceæ.*
ECHIALES.	
A.—Flowers regular.	
•Jessamine Family	..*Jasminaceæ.*
•Heliotrope "	..*Ehretiaceæ.*
•Nolana "	..*Nolanaceæ.*
BORAGE "	..*Boraginaceæ.*
B.—Flowers irregular.	
SAGE Family	..*Labiatæ.*
Verbena "	..*Verbenaceæ.*
•Selago "	..*Selaginaceæ.*
BIGNONIALES.	
•Gloxinia Family	..*Gesneraceæ.*
•Bignonia "	..*Bignoniaceæ.*
•JUSTICIA "	..*Acanthaceæ.*
FOXGLOVE "	..*Scrofulariaceæ.*
Butterwort "	..*Lentibulariaceæ.*

GROUP 3.—*Perianth and Stamens upon the summit of the Ovary. (Epigynous.)*

CAMPANALES.	
Campanula Family	..*Campanulaceæ.*
Lobelia "	..*Lobeliaceæ.*
•Goodenia "	..*Goodeniaceæ.*
•Stylidium "	..*Stylidiaceæ.*
VALERIAN "	..*Valerianaceæ.*
Scabious "	..*Dipsacaceæ.*
DAISY "	..*Compositæ.*
MYRTALES.	
•Combretum Family	*Combretaceæ.*
•Fringe-myrtle "	*Chamælauciaceæ.*
Water Featherweed "	*Halorageaceæ.*
FUCHSIA "	*Onagraceæ.*
•Melastoma "	*Melastomaceæ.*
•MYRTLE "	*Myrtaceæ.*
CACTALES.	
•Chili-nettle Family	..*Loasaceæ.*
•CACTUS "	..*Cactaceæ.*

GROSSALES.	
CURRANT Family	..*Grossulaceæ.*
•Escallonia	..*Escalloniaceæ.*
•Mock-orange	..*Philadelphaceæ.*
CINCHONALES.	
Whinberry Family	..*Vacciniaceæ.*
•COFFEE-TREE "	..*Cinchonaceæ.*
Honeysuckle "	..*Caprifoliaceæ.*
WOODRUFF "	..*Galiaceæ.*
UMBELLALES.	
PARSLEY Family	..*Umbelliferæ.*
Ivy "	..*Araliaceæ.*
Dogwood "	..*Cornaceæ.*
ASARALES.	
Sandal-wood Family	*Santalaceæ.*
Mistleto "	..*Loranthaceæ.*
Birthwort "	..*Aristolochiaceæ.*

SECTION 2.—UNISEXUAL EXOGENS.

English Name.	Latin Name.
AMENTALES.	
BIRCH-TREE Family	..*Betulaceæ.*
WILLOW "	..*Salicaceæ.*
Sweet Gale "	..*Myricaceæ.*
•Shepherdia "	..*Elæagnaceæ.*
URTICALES.	
Nettle Family	..*Urticaceæ.*
Hornwort "	..*Ceratophyllaceæ.*
HEMP "	..*Cannabinaceæ.*
•MULBERRY "	..*Moraceæ.*
•Plane-tree "	..*Platanaceæ.*
EUPHORBIALES.	
SPURGE Family	..*Euphorbiaceæ.*
Water-starweed "	..*Callitrichaceæ.*

English Name.	Latin Name.
EUPHORBIALES—(*Continued*).	
Crowberry Family	..*Empetraceæ.*
•Pitcher-plant "	..*Nepenthaceæ.*
QUERNALES.	
OAK Family	..*Corylaceæ.*
•Walnut "	..*Juglandaceæ.*
GARRYALES.	
•Garrya Family	..*Garryaceæ.*
CUCURBITALES.	
CUCUMBER Family	..*Cucurbitaceæ.*
•Begonia "	..*Begoniaceæ.*

CLASS II.—ENDOGENS.

NARCISSALES.	
•Pine-apple Family	..*Bromeliaceæ.*
SNOWDROP "	..*Amaryllidaceæ.*
CROCUS "	..*Iridaceæ.*
AMOMALES.	
•Banana Family	..*Musaceæ.*
•GINGER "	..*Scitamineæ.*
ORCHIDALES.	
ORCHIS Family	..*Orchidaceæ.*
XYRIDALES.	
•Spiderwort Family	..*Commelynaceæ.*
JUNCALES.	
RUSH Family	..*Juncaceæ.*
Sweet-flag "	..*Orontiaceæ.*
LILIALES.	
LILY Family	..*Liliaceæ.*
Colchicum "	..*Melanthaceæ.*

ALISMALES.	
Alisma Family	..*Alismaceæ.*
ARALES.	
Duckmeat Family	..*Lemnaceæ.*
Reed-mace "	..*Typhaceæ.*
Arum "	..*Araceæ.*
PALMALES.	
•PALM-TREE Family	..*Palmæ.*
HYDRALES.	
Frog-bit Family	..*Hydrocharidaceæ.*
Pondweed "	..*Naiadaceæ.*
Zostera "	..*Zosteraceæ.*
GLUMALES.	
GRASS Family	..*Gramina.*
SEDGE "	..*Cyperaceæ.*
Pipewort "	..*Eriocaulaceæ.*

INTERMEDIATE FAMILIES.

•Cycas Family	..*Cycadaceæ.*
FIR-TREE "	..*Coniferæ.*
YEW-TREE "	..*Taxaceæ.*
TAMUS Family	..*Dioscoreaceæ.*
True-love "	..*Trilliaceæ.*
•Lapageria "	..*Philesiaceæ.*

CLASS III.—CORMOGENS.

FILICALES.	
FERN Family	..*Filices.*
LYCOPODALES.	
Lycopodium Family	..*Lycopodiaceæ.*
Pill-wort "	..*Marsileaceæ.*
MUSCALES.	
Moss Family	..*Musci.*
Marchantia Family	..*Marchantiaceæ.*
HORSETAIL "	..*Equiseta.*

CLASS IV.—THALLOGENS.

LICHEN Family	..*Lichenes.*
MUSHROOM "	..*Fungi.*
Chara Family	..*Characeæ.*
SEAWEED "	..*Algæ.*

GENERA AND SPECIES.

"Genera" bear the same relation to families that the families do to the alliances and primary classes. Walk round a large garden, and you will see many kinds of lupine, and many kinds of potentilla. Similarly, in the fields, we find many kinds of buttercup, and many kinds of sedge. Each of these little companies, the lupines, the potentillas, the buttercups, the sedges, constitutes a "genus," and each of the constituent kinds is a "species." The "genera" are founded upon peculiarities in the flower and fruit, common to all the species which they include; the "species" are distinguished by differences in the form of the leaves and the inflorescence, and in the general habit and configuration of the plant. It is often observable also that species have their own particular habitats or places of growth, that their flowers have peculiar odours, and that they blossom at definite seasons, different from those of the other species of their genus. To a certain extent characters and preferences of this nature are observable likewise in genera; but in neither case do they constitute prime and diagnostic characters, which must always be such as dried specimens will shew nearly as well as living ones: in other words, the essential characters of the genus and species depend alike upon the *structure* of the plant, and on nothing else, though when the structure is eccentric and perplexing, the habitat, odour, &c. have great value as suggesting and corroborating the affinities of the plant, and when the proper characters have been ascertained, they become a useful supplement.

In some families the genera are very easily discriminated; in others they are distinguished with difficulty. As a rule, the easier it is to tell the family, the more are we puzzled with the genera, and *vice versá.* Ferns, grasses, fungi, are told on the instant, and the youngest botanical learner has no doubt as to the family of a cruciferous plant, or an umbelliferous one. But the genera of ferns, grasses, fungi, and the others, are scarcely yet made out with certainty, and it is rare to find two botanists agreed about them; the fact being that genera, like families, may be made more or less extensive according to the mental constitution of the botanist who undertakes to determine the characters, some botanists being for very limited and rigid boundaries, others considering a comparatively wide deviation still compatible. Hence it is that the common shield-fern is by some called "Aspidium," by others "Nephrodium," by others again, "Lastræa." Nothing, on the contrary, is more easy than to recognise an aconite, an anemone, a clematis, a meadow-rue, each representing a genus; but there must be much study in order to see that these are all indubitable members of the Ranunculaceæ. To beginners, the characters of genera are almost always embarrassing. True, when once a species of any given genus is well known, all the others of the genus including it are, for the most part, easily identified as such, even when seen for the first time, by the similarity of their habit and contour, since the external likeness is usually a readier guide than the strict technical or scientific character, and hence we very soon learn buttercups, heaths, roses, brambles, &c. by *sight*. But the *technical* character lies deeper. To determine this we have usually to wait for the ripe fruit, by which time the flowers are gone, and the foliage is often faded. For this reason, in the present volume, which is intended to enable people to find out the names of plants, readily and satisfactorily, the deep-seated and often inaccessible generic characters are not, as in most botanical works, put as barricades at the entrance, nor even given afterwards in detail. When wanted by the student, there are plenty of learned volumes, saturated with Greek and Latin, from which he may collect them; and meanwhile, all that is practically needed to determine unknown plants is supplied by the "Key to the Families and Exceptional Species," the genus being intimated in the name.

"Species," like genera, are more or less easily distinguishable according to circumstances, and, to a certain extent, also resemble genera in being subject to the imagination of man. Some botanists combine many various aspects and configurations, as expressed in individuals, and say "these are all compatible with the idea of the species;" others take these various aspects as denoting *difference* of species. Hence we find the number of species of British flowering-plants reckoned by Mr. Bentham as less than 1300*; by Mr. Babington as nearly 1700†. The cause of the diversity of aspect lies, according to the former school, in the influence of soil, climate, and other physical conditions and circumstances of growth, and their operation is unquestionably very powerful. But no one can yet say how far it

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[*] Handbook of the British Flora, 1858.

[†] Manual of British Botany, 1856.

modifies plants permanently, nor to what extent Mr. Darwin's doctrines of "natural selection," and the gradual elaboration of all forms of vegetables from a single primæval form, are true, or likely to be true. It is easy to pick out differential features in plants; but the full idea of a species includes not merely technical characters, but all its relations and history, no plant being rightly understood, any more than any animal, till it has been viewed, for a time, as the very centre and pivot of nature. Plants undergo incredible changes of form beneath our very eyes, and seem to take delight in outstripping our wonder at their capacity for harlequinade. It is plain, moreover, that there is an homology in plants, just as there is in animals, and that what we call "differences," and think absolute, are to an enlarged and philosophical apprehension merely varied utterances of the same general statement,—the melody played an octave higher or an octave lower,—the same thought expressed in another dialect, palpably enough to the linguist; and that accidents and gardeners ruin all definitions of species, however carefully drawn up. On the other hand, there are magnificent principles of nature that at once prepare us for all this waywardness, and reconcile us to all this mystery, and that seem to point to an original multiplicity of species as one of the prime characters of creation, the present occupants of the soil appearing upon our planet as the last of many successive dynasties that have followed one another during the lapse of ages,—not, however, as the result merely of monotonous physical causes, to which the origins of things can never be ultimately referred, but as the result of profounder ones, lying far back, and operating from the invisible world in which all nature has its beginning and permanency.* These principles bring with them the consoling conviction that some part, at least, of what we see around us, is fixed and immutable, and that Botany has something more to deal with than vague and extinguishable phenomena. In any case, for the purposes of practical Botany, plants in their great mass are permanent in form, and plainly enough distinguishable. There are over 1200 forms in Great Britain, which are as distinct from one another as our brothers and cousins are, and which no one objects to call "species;" the white water-lily and the yellow water-lily, the sweet violet and the dogs' violet, are subjects of no dispute:—in the permanency of these there is perennial delight; as in the sportiveness of the ferns an ever-recurring astonishment.

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* See the author's "Life, its Nature, &c." pp. 127, 128, and 321. Ed. 2.

Varieties.

"Varieties" are those deviations from the wild specific type, induced by accidents of soil and situation, and more particularly by cultivation, which adorn our gardens with the countless forms presented by the dahlia, the pansy, the hyacinth, and the majority of "florists' flowers." Varieties also occur, though not so frequently, among plants living in a state of nature. It is over these latter that there is so much conflict of opinion, as when the sixty or seventy varieties of the common bramble are published as so many "species." When the difference lies merely in the colour of the flower, which often happens, or in its conversion into the "double" condition, though the amount of change differs only in degree, it is considered unimportant. A large class of varieties among wild plants comprehends those induced by growth in water. The leaves of plants which on the edges of a pond or stream are broad and flat, often, when wholly submerged, and especially if subjected to a current, lengthen into long, green, hair-like fibres, that remind us of some seaweeds. No rule can be laid down for discriminating at all times between the normal or original form of a plant and the varieties it may run into. Large experience can alone even approximate this power. The best that can be said perhaps is that the "variety" seldom repeats itself through its seeds, but relapses into the original form, or changes to another variety. But it always keeps true to the species it belongs to. The dahlia is still a dahlia, whatever its hue, and whether it be a "globe" or a "quilled."

Hybrids.

"Hybrids" are vegetable mules,—that is to say, intermediate forms obtained by applying the pollen of one species or variety to the stigma of a different one. Gardeners now raise great numbers of hybrids, both among culinary vegetables and ornamental flowers. Such plants of course cannot inherit the name of either parent, and their origin is generally expressed in a special appellation. Hybrids are probably very rare in wild nature. Although the bees carry pollen casually from one species of plant to another, the integrity of each appears to be preserved by its peculiar economy. The differences in the pollen-grains and in the organization of the stigma probably serve as a physical hindrance, but lying underneath there is no doubt a chaste antipathy, too exquisite for eyes that look merely at the anatomy of the parts; there, nevertheless, preserving the lily immaculate, and the snowdrop not more pure in petals than in life.

THE NAMES OF PLANTS.

A few words may be said in conclusion upon the *names* applied to plants. These are either vernacular or "botanical." The vernacular name is that by which a plant is commonly called in the country or district where it grows wild or is ordinarily cultivated; the "botanical" is that by which it is known to science, and is either directly derived from the Latin or Greek language, or has had a Latin form and termination given to it, at once for the sake of uniformity, and to adapt it for citation either in Latin writings or in foreign languages. The Latin names have in no case been given out of pedantry; they are absolutely necessary to men of science, who cannot possibly communicate accurately without using them. Both sets of names have in many cases an "alias." The vernacular names differ in almost every part of the country,—the daisy, for instance, which in France is called the "marguerite," being in Scotland termed "gowans;" the botanical names similarly differ in various authors, owing principally to individual and usually improved views as to the affinities of plants. But there is a great deal of mere caprice in this matter, and a large portion of the synonyms with which books are unhappily crowded would have been better never invented. Properly constructed, both the vernacular and the botanical names are twofold, one denoting the genus and the other the species. Thus, LATH'YRUS *latifo'lius*, the "broad-leaved pea;" LATH'YRUS *odora'tus*, the "sweet-scented pea;" LATH'YRUS *azu'reus*, the "blue-flowered pea." LATHYRUS and "pea" are here the "generic" names, and the adjectives are the "specific." In some instances, vernacular names are simple, as primrose, cowslip, daffodil, and turnip; but it is seldom that a precise idea is conveyed by such, any more than by the use of a man's surname without the "Christian." The particular derivations or etymologies of the various names, both vernacular and botanical, have to be sought in many directions. They form an immense and very delightful object of investigation, being in many cases extremely ancient, and often highly figurative and poetical. Many others are commemorative, or given in honour of eminent botanists, whose example is thus pleasantly held up before the mind when the plant happens to come in view. Such are *Linnæ'a*, *Banks'ia*, *Ca'leya*.

ARTIFICIAL KEY

THE FAMILIES AND EXCEPTIONAL AND ANOMALOUS SPECIES DESCRIBED OR REFERRED TO IN THIS VOLUME.

PRELIMINARY INDEX TO THE CLASSES.

A.

OWERS COMPLETE, *i.e.*, consisting of a distinct perianth (the parts of which are whorled); and containing stamens and pistils, or one or other of these parts.

. Flowers Compound; *i.e.*, formed as described on pp. 35—37.
CLASS I. COMPOSITÆ, p. 425.

. Flowers Simple.

1. Stamens and pistil consolidated into a single body.....CLASS II. p. 69.
2. Flowers unisexual, *i.e.*, individually containing stamens only, or pistils only; the two kinds of flowers sometimes upon different individuals.
CLASS III. p. 69.
3. Flowers bisexual, *i.e.*, containing both stamens and pistils. Styles and stigmas quite free from the stamens, though sometimes adherent or united to one another. Stamens either free, or adherent to one another or to the perianth.
    - *a*. Stamens more than ten.
        - Ovary or ovaries "superior"...............CLASS IV. p. 71.
        - Ovary "inferior"........................CLASS V. p. 74.
    - *b*. Stamens not more than ten.
        - (1) Ovary "inferior."
            - Flowers regular ....CLASS VI. p. 74.
            - Flowers irregular...................CLASS VII. p. 76.
        - (2) Ovary or ovaries "superior."
            - Corolla irregular (or calyx, if no corolla).
CLASS VIII. p. 77.
            - Corolla regular (or calyx, if no corolla.)
                - (*a*) Perianth trimerous ....CLASS IX. p. 78.
                - (*b*) Perianth tetramerous ....CLASS X. p. 79.
                - (*c*) Perianth pentamerous.
                    - Stamens exactly ten........CLASS XI. p. 81.
                    - Stamens exactly five.......CLASS XII. p. 82.
                    - Stamens any number under ten, except five.
CLASS XIII. p. 85.
                - (*d*) Perianth with the parts in sevens.
CLASS XIV. p. 86.
                - (*e*) Perianth of more than ten pieces. Stamens few.
CLASS XV. p. 86.

B.

WERS INCOMPLETE, *i.e.*, either totally destitute of perianth, or having the stamens and pistils protected only by bracts ....CLASS XVI. p. 86.

C.

WERLESS PLANTS ....CLASS XVII. p. 88.

PARTICULAR ANALYSIS.

CLASS II.

FLOWERS COMPLETE, THE PARTS WHORLED, AND THE STAMENS AND PISTIL CONSOLIDATED INTO A SINGLE BODY.

Ovary superior. Flowers regular and pentamerous..Wax-flower-family, p. 342.

Ovary inferior.

Leaves parallel-veined. Flowers very irregular....Orchis-family, p. 651.

Leaves net-veined.

Stamens two..............................Stylidium-family, p. 481.

Stamens six..............................Birthwort-family, p. 559.

CLASS III.

FLOWERS SIMPLE AND UNISEXUAL.

A. Aquatic plants.

1. Herbage wholly submerged.

[Leaves pectinate.....................Water-featherweed, p. 491.]

Flowers capitate.............................Eriocaulon, p. 758.

Flowers solitary............Anacharis, p. 683—Vallisneria, p. 684.

2. Leaves floating flat on surface.......................Frogbit, p. 682.

3. Leaves emerged and erect.

Leaves serrate............................Water-soldier, p. 682.

Leaves arrow-shaped..........................Arrow-leaf, p. 685.

[Leaves grass-like...........................Littorella, p. 371.]

B. Twining plants (without tendrils.)

1. Wild British plants.

Glabrous. Flowers trimerous......................Tamus, p. 759.

Rough and harsh.....................................Hop, p. 604.

2. Rare garden exotics.

Flowers trimerous ....Menispermaceæ, &c., p. 621—Dioscoreaceæ, p. 759—Smilaceæ, p. 761.

[Flowers pentamerous.........................Œnoplia, p. 312.]

C. Tendrilled climbers or trailers.

Plant harsh and rough ....Cucumber-family, p. 562.

[Plant glabrous or nearly so ....Grape-vine-family, p. 187.]

D. [Trees with opposite and fan-veined leaves.........Maple-family, p. 176.]

E. [Parasitic evergreen shrub ....Mistletoe, p. 554.]

F. Stinging herbaceous plants ....Nettle, p. 602.

G. Trailing heath-like moorland evergreen ....Crowberry, p. 618.

H. [Leaves in numerous whorls of four. Herbaceous......Galiaceæ, p. 504.]

I. [Flowers in umbels............Umbelliferæ, p. 525—Araliaceæ, p. 550.]

J. Leaves septate..Hemp, p. 603.

K. [Leaves with *ocreate* stipules ....Polygonaceæ, p. 216.]

L. [Flowers minute, and concealed among bracts....Amaranth-family, p. 211.]

M. Leaves bearing pitchers..........................Nepenthaceæ, p. 620.

N. Plant rush-like...................................Xyridaceæ, p. 758.

CLASS III.—*Continued.*

O. Trees and shrubs.

1. Inflorescence enclosed in a spathe......................PALMS, p. 700.
2. [Little yellow flowers previous to leaves...CORNELIAN-CHERRY, p. 557.]
3. Leaves covered with silvery scales..........ELÆAGNUS-FAMILY, p. 599.
4. [Leaves dotted with oil-glands. Flowers usually green or brownish. ORANGE-FAMILY, p. 210—XANTHOXYLACEÆ, p. 188—TASMANNIA, p. 113—ANACARDIACEÆ, p. 214.]
5. Leaves aromatic when bruised.
   [Leaves ovate. Flowers diœcious ....BAY-TREE, p. 237.]
   Leaves pinnate ....WALNUT (FEMALE FLOWERS), p. 595.
6. [Flowers in dense globular heads, or oblong or cylindrical clusters, seeming all stamens. Greenhouse plants ....ACACIA, &c., p. 267.]
7. Male flowers in pendulous catkins.
   Previous to leaves......................BIRCH-TREE-FAMILY, p. 576.
   Evergreen shrub, blossoming in winter..............GARRYA, p. 600.
8. [Flower attached to middle of leaf....BUTCHERS'-BROOM, pp. 626, 640.]
9. Flowers along edge of *quasi*-leaves or leaflets......XYLOPHYLLA, p. 617.
10. Leaves oblique. Perianth coloured. Stamens numerous. Ovary three-cornered.....................................BEGONIA, p. 565.
11. Leaves ternate, trifoliolate, or simply-pinnate ......NEGUNDO, p. 178—XANTHOXYLACEÆ, p. 188—ANACARDIACEÆ, p. 214—GYMNOCLADUS, p. 266—JUGLANDACEÆ, p. 594.
12. Leaves opposite. Flowers very small.
    Leaves 3—9 inches long and 2—3 inches broad......AUCUBA, p. 558.
    Leaves ¾—3 inches long and ½—1 inch broad...BOX-TREE, pp. 611, 617.
13. Leaves alternate or scattered.
    a. Evergreens.
      [Flowers white ....HOLLY-FAMILY, p. 313.]
      Flowers yellowish ....NUTMEG, p. 622.
      Various ....[PROTEACEÆ, p. 234]—EUPHORBIACEÆ, p. 608.
    b. Deciduous.
      [Wild-shrub.....................MOUNTAIN-CURRANT, p. 517.]
      Garden plants. *Leaves rough* ....[ELM-FAMILY, p. 307]—MULBERRY, p. 607.
      Garden plants. *Leaves smooth or glabrous*....[STERCULIA, p. 171—CELASTRACEÆ, p. 310—RHAMNACEÆ, p. 311—PRINOS, p. 313—EBENACEÆ, p. 314]—TUPELO, p. 498—SANTALACEÆ, p. 555—LIQUIDAMBAR, p. 597—EUPHORBIACEÆ, p. 608.

P. Herbaceous plants, the flowers containing *stamens only*.

1. Stamens more than ten.
   a. [Flowers in dense globular heads or oblong spikes. LADY'S-MANTLE-FAMILY, p. 272.]
   b. Flowers in pendulous corymbs ....BEGONIA, p. 565.
   c. [Flowers solitary, or in small upright corymbs. Leaves symmetrical. ROSE-FAMILY, p. 280.]
2. Stamens not more than ten. *Perianth trimerous*......MERCURY, p. 611.

CLASS III.—*Continued.*

- 3. Stamens not more than ten. *Perianth tetramerous.*
  - *a.* [Leaves all radical .... LITTORELLA, p. 371.]
  - *b.* Stem leafy.
    - Leaves minute .... ARTILLERY-PLANT, p. 603.
    - [Leaves an inch long........................ ROSE-ROOT, p. 159.]
- 4. Stamens not more than ten. *Perianth pentamerous.*
  - *a.* [Stamens ten........................ CARNATION-FAMILY, p. 192.]
  - *b.* Stamens five or less.
    - [Leaves opposite. Stamens three............ VALERIAN, p. 469.]
    - Leaves rough ....[XANTHIUM, p. 445]—CUCURBITACEÆ, p. 562.
    - [Leaves smooth, or mealy, or glaucous .. SPINACH-FAMILY, p. 225.]

Q. Herbaceous plants; the flowers containing pistils only.

- 1. Ovaries two or more.
  - *a.* Leaves opposite.............................. MERCURY, p. 611.
  - *b.* [Leaves alternate.
    - Flower 3—6 inches across .... PÆONY, p. 102.
    - Flower pentamerous; ½—1 inch across...... ROSE-FAMILY, p. 280.
    - Flowers green and insignificant .... XANTHIUM, p. 445.]
- 2. Ovary solitary and *superior.*
  - *a.* [Leaves pinnate or *quasi*-pinnate... LADY'S-MANTLE-FAMILY, p. 272.]
  - *b.* [Leaves opposite .... CARNATION-FAMILY, p. 192.]
  - *c.* Ovary three-lobed .... SPURGE-FAMILY, p. 608.
  - *d.* Perianth tetramerous.................... NETTLE-FAMILY, p. 601.
  - *e.* [Perianth trimerous or pentamerous...... SPINACH-FAMILY, p. 225.]
- 3. Ovary solitary and *inferior.*
  - *a.* Ovary three-winged .... BEGONIA, p. 565.
  - *b.* [Leaves opposite .... VALERIAN-FAMILY, p. 469.]
  - *c.* Leaves alternate .... CUCUMBER-FAMILY, p. 562.

CLASS IV.

FLOWERS COMPLETE, SIMPLE, AND BISEXUAL.—STAMENS MORE THAN TEN.—OVARY OR OVARIES "SUPERIOR."

A. Stamens monadelphous. Flowers regular.

- 1. Anthers one-celled. Calyx usually double...... MALLOW-FAMILY, p. 127.
- 2. Anthers two-celled. Exotic shrubs and trees.
  - *a.* Calyx imbricated .... TERNSTROMIACEÆ, p. 130.
  - *b.* Calyx valvate.
    - Anthers turned inwards .... BYTTNERIACEÆ, p. 190.
    - Anthers turned outwards .... STERCULIACEÆ, p. 171.

B. Stamens polyadelphous. Flowers regular.

- 1. Ovary simple.
  - Leaves alternate .... AURANTIACEÆ, p. 210.
  - Leaves opposite .... ST. JOHN'S-WORT-FAMILY, p. 105.
- 2. Ovary lobed. Greenhouse exotics.
  - Calyx valvate .... GERANIACEÆ, p. 115.
  - Calyx imbricated .... BYTTNERIACEÆ, p. 190.

CLASS IV.—*Continued.*

C. Stamens neither monadelphous nor polyadelphous, usually free, sometimes adherent to the perianth. *Plant living in water.* Flowers regular.

1. Flowers trimerous. Endogens.
   Flowers yellow .... Limnocharis, p. 687.
   Flowers white .... Water-soldier, p. 682.
2. Flowers trimerous, tetramerous, or pentamerous. Exogens.
   a. Ovaries numerous and distinct.
      Stamens hypogynous .... Ranunculaceæ, p. 91.
      Stamens perigynous .... Water-septfoil, p. 286.
   b. Ovary solitary, or if more than one, apparently solitary by reason of consolidation.
      Stamens hypogynous. Leaves circular or oval.
         Water-lily-family, p. 89—Nelumbium-family, p. 91.
      Stamens perigynous. Leaves opposite or whorled. Stems erect .... Lythraceæ, p. 305.

D. Stamens as in **C.** *Plant living upon land;* if in marshy ground, not as an aquatic.

1. Ovary solitary, and *elevated on a long stalk*... Capparidaceæ, p. 210.
2. Receptacle greatly developed and laterally dilated.
   a. Ovary three-lobed, and open at the top........ Reseda, p. 153.
   b. Ovary solitary and not open at top...... Capparidaceæ, p. 210.
   c. Ovaries two or more, often numerous...... Pæony, pp. 95, 103.
3. Leaves all radical, and mostly converted into tubular or bag-like pitchers .... Cephalotus, p. 91—Sarracenia, p. 104.
4. Leaves transparently dotted and entire.
   Leaves opposite........................ St. John's-worts, p. 105.
   Leaves alternate....................... Orange-family, p. 210.
5. Black glands along the edges of the sepals or petals. Ovary solitary.
   Leaves opposite. St. John's-worts, p. 105.
6. Flowers usually minute, clustered in racemes or globular heads, seeming all stamens, and mostly yellow. Exotic shrubs.. Acacias, p. 267.
7. Perianth irregular, either single or double.
   a. Stamens hypogynous. Leaves alternate.
      Juice of plant thin and watery........ Ranunculaceæ, p. 91.
      Juice milky or coloured .... Poppy-family, p. 108.
   b. Stamens perigynous. Leaves opposite..... Lythraceæ, p. 305.
8. Perianth single, regular, and often petaloid.
   a. Stamens hypogynous. Leaves alternate.
      (1) Perianth of 2 pieces. Fruit 1-celled.. Poppy-family, p. 108.
      (2) [Perianth two-lobed. Plant thorny.. Euphorbia, p. 616.]
      (3) Perianth of three or more pieces or lobes.
         (a) Ovary solitary and simple .... Ranunculaceæ, p. 91.
         (b) Ovary solitary and lobed.... Phytolaccaceæ, p. 216—[Euphorbia, pp. 608, 616.]
         (c) Ovaries two or more, usually numerous.
            Ranunculaceæ, p. 91.

CLASS IV.—*Continued.*

b. Stamens perigynous. Leaves opposite.
  Calyx tubular and ribbed ....LYTHRACEÆ, p. 305.
  Calyx not ribbed. Exotic shrubs ....HYDRANGEACEÆ, p. 305—CUNONIACEÆ, p. 305.

9. Calyx and corolla both present, and their parts *alike*.
  Stamens hypogynous....RANUNCULACEÆ, p. 91—MAGNOLIACEÆ, p. 113.
  Stamens perigynous ....CALYCANTHUS, p. 236.

10. Calyx and corolla both present; their parts *not alike*.
  a. Stamens hypogynous.
    (A) Leaves with stipules (the stipules sometimes deciduous).
      (1) Base of leaf unsymmetrical, as in Fig. 91. Trees. TILIA, p. 126.
      (2) Ovary simple or nearly so............CISTACEÆ, p. 130—TILIACEÆ, p. 126—ZYGOPHYLLACEÆ, p. 231.
      (3) Carpels numerous and usually agglutinated. Exotic trees and shrubs....................MAGNOLIACEÆ, p. 113.
    (B) Calyx irregular. Leaves much divided..RANUNCULACEÆ, p. 91.
    (C) Sepals two, and of the same size.
      Corolla tetramerous.................POPPY-FAMILY, p. 108.
      Corolla pentamerous................PORTULACACEÆ, p. 214.
    (D) Sepals 3 or 6 (sometimes two little ones outside, in addition).
      (1) Petals numerous.................RANUNCULACEÆ, p. 91.
      (2) Petals 5—6—9.
        (a) Herbaceous plants. Juice thin and watery. RANUNCULACEÆ, p. 91.
        (*b*) Herbaceous plants. Juice usually milky or coloured. POPPY-FAMILY, p. 108.
        (*c*) Trees or shrubs, or with woody stems. CISTACEÆ, p. 130—ANONACEÆ, p. 175.
    (E) Sepals four. Petals four ....RANUNCULACEÆ, p. 91—CAPPARIDACEÆ, p. 210.
    (F) Sepals 5—8—10, and all of the same size, or nearly so.
      Herbaceous plants ....RANUNCULACEÆ, p. 91.
      Trees and shrubs ....AURANTIACEÆ, p. 210—DILLENIACEÆ, p. 182.
    (G) Sepals and petals seven each. Exotic shrub...BEJARIA, p. 169.
    (H) Sepals and petals 10–12–24 each.....HOUSELEEK, pp. 160, 162.
  b. Stamens perigynous.
    (A) Ovary solitary or apparently so.
      (1) Leaves opposite...................LYTHRACEÆ, p. 305—HYDRANGEACEÆ, p. 304.
      (2) Leaves alternate.
        Herbaceous plants ....[CHRYSEIS, &c., p. 112—PORTULACACEÆ, p. 214]—MESEMBRYACEÆ, p. 235.
        Trees or shrubs....APPLE-FAMILY, p. 274—PLUM-FAMILY, p. 269, ROSE-FAMILY, p. 280.
    (B) Ovaries or styles 2—3—20—50 or more. ROSE-FAMILY, p. 280—HYDRANGEACEÆ, p. 304.

7

CLASS VI.—*Continued.*

9. Leaves opposite, and *without interpetiolar stipules.*
    - *a.* Stamens upon the ovary. Petals free ....PHILADELPHACEÆ, p. 522.
    - *b.* Stamens upon the calyx. Petals free........COMBRETACEÆ, p. 497.
    - *c.* Stamens upon the corolla. Petals more or less united.
        - Herbaceous plants....VALERIANACEÆ, p. 469—DIPSACACEÆ, p. 472.
        - Shrubs ................................CAPRIFOLIACEÆ, p. 512.

10. Leaves alternate and *stipulate.*
    - Exotic shrubs...........................HAMAMELIDACEÆ, p. 558.
    - [Herbaceous plant. Flowers yellow..............AGRIMONY, p. 285.]

11. Leaves alternate and *without stipules.*
    - *a.* Petals free.
        - (1) Flowers in umbels..IVY-FAMILY, p. 550—UMBELLIFERÆ, p. 525.
        - (2) Flowers usually racemose or axillary.
            - Fruit succulent ....CURRANT-FAMILY, p. 517.
            - Fruit capsular...ESCALLONIACEÆ, p. 519–ONAGRACEÆ, p. 483.
    - *b.* Petals united.
        - (1) Stigma simple. Stamens free..WHORTLEBERRY-FAMILY, p. 520.
        - (2) Stigmas three or more............CAMPANULA-FAMILY, p. 474.
        - (3) [Stigma capitate. Flowers minute and white..SAMOLUS, p. 349.]

CLASS VII.

FLOWERS SIMPLE AND BISEXUAL.—STAMENS NOT MORE THAN TEN.—OVARY "INFERIOR" (OR PARTIALLY SO.)—COROLLA IRREGULAR.

A. Leaves parallel-veined. Endogens.

1. Leaves with a midrib, from which the veins flow to the margins.
    - Only one perfect stamen..ZINGIBERACEÆ, p. 693—MARANTACEÆ, p. 695.
    - Several perfect stamens ....MUSACEÆ, p. 692.
2. Veins proceeding from the base to the apex.
    - Stamens six ....SNOWDROP-FAMILY, p. 641.
    - Stamens three ....IRIS-FAMILY, p. 646.

B. Leaves net-veined. Exogens.

1. Leaves opposite.
    - *a.* Petals more or less united.
        - (1) Shrubs (sometimes twining)..........CAPRIFOLIACEÆ, p. 512.
        - (2) Herbaceous plants.
            - (*a*) Stamens two or four.
                - Plant erect. Flowers in heads ....DIPSACACEÆ, p. 472.
                - Plant trailing ....LINNÆA, p. 513.
            - (*b*) Stamens one, three, or five......VALERIAN-FAMILY, p. 469.
    - *b.* Petals all quite free.
        - Leaves ribbed. Greenhouse plants ......MELASTOMACEÆ, p. 495.
        - Leaves not ribbed ....ONAGRACEÆ, p. 483.

CLASS VII.—*Continued.*

2. Leaves alternate.

  a. Flowers in (usually compound) umbels......Umbelliferæ, p. 525.

  b. Anthers united ....Lobeliaceæ, p. 481.

  c. Stigma indusiate. Greenhouse plants ......Goodeniaceæ, p. 483.

  d. Stigma either capitate, or 4—6—8 lobed ......Onagraceæ, p. 483—[Gesneraceæ, p. 419.]

CLASS VIII.

FLOWERS SIMPLE AND BISEXUAL.—STAMENS NOT MORE THAN TEN.—OVARY "SUPERIOR."—COROLLA IRREGULAR.

A. Living in water (mostly either floating or submerged.)

  1. Flowers yellow. Stamens two..................Bladderwort, p. 423.

  2. Flowers blue or pinkish. Stamens two............Speedwell, p. 399.

  3. Flowers in rose-coloured spikes ....Amphibious Persicaria, p. 220.

  4. Leaves parallel-veined. Choice exotics.........Pontederaceæ, p. 690.

  5. Anthers coherent. Hothouse plant..................Tytonia, p. 115.

B. Living upon land.

  1. Flowers papilionaceous..........................Pea-family, p. 238.

  2. Flowers *quasi*-papilionaceous, with a tuft in front.....Polygala, p. 178.

  3. Petals four, the two inner ones cohering at the tips..Fumariaceæ, p. 182.

  4. No leaves, nor any green in the plant. Herbaceous parasites. Orobanchaceæ, p. 318.

  5. Flowers appearing previously to the leaves.

    Shrubs with showy flowers ....Ericaceæ, p. 163.

    Trees with insignificant brownish flowers ....Ulmaceæ, p. 307.

  6. Ovary stipitate, or on a greatly dilated disk. Stamens *hypogynous and very long*. Greenhouse plants....................Capparidaceæ, p. 210.

  7. Stamens tetradynamous. Petals free..............Cruciferæ, p. 132.

  8. Leaves all radical.

    a. Petals free.

      (1) Ovary simple. Stamens hypogynous.

        Calyx extended behind.............Violet-family, p. 155.

        Corolla arched. Choice exotics......Balsam-family, p. 113.

      (2) Ovary 2–3-lobed. Stamens perigynous..Saxifragaceæ, p. 297.

    b. Petals united. Flowers usually solitary.

      Stamens two. Wild British plants..........Butterwort, p. 423.

      Stamens 2—4—5. Hothouse plants ....Gesneraceæ, p. 419.

  9. Leaves stipulate.

    a. Calyx extended behind. Herbaceous plants .....Violaceæ, p. 155.

    b. Ovary five-lobed. Stigmas five ....Geraniaceæ, p. 115.

    c. Perianth single. Stipules ocreate ....Polygonaceæ, p. 216.

    d. Leaves abruptly-pinnate. Greenhouse plants.......Cassia, p. 268.

  10. Leaves conspicuously parallel-veined. Endogens.

    Calyx green ....Commelynaceæ, p. 687.

    Calyx and corolla alike ....Lily-family, p. 623.

  11. Flowers in incurved racemes ....Echium, pp. 362, 369.

CLASS X.—*Continued.*

- *b.* Stamens perigynous.
    - (1) Large trees. Leaves (if any) rough .... ULMACEÆ, p. 307.
    - (2) Shrubs or small trees. Leaves (if any) smooth or glabrous.
        - (*a*) Stamens 2, 4, or 8. Anthers opening lengthways. MEZEREON-FAMILY, p. 233—RHAMNACEÆ, p. 311.
        - (*b*) Stamens 6 or 9. Anthers opening by recurved valves. LAURACEÆ, p. 237.
        - (*c*) Stamens 4. Perianth valvate ...... PROTEACEÆ, p. 234.
- 2. Both calyx and corolla.
    - *a.* Leaves minute and appressed. Stamens four. Stigmas four. TAMARISK, p. 175.
    - *b.* Leaves dotted, or covered below with microscopic stellate hairs, and often strongly-scented.
        - Fruit capsular, and finally apocarpous........ RUTACEÆ, p. 189.
        - Fruit succulent and indehiscent .... ORANGE-FAMILY, p. 210.
    - *c.* Stamens two or four, and *hypogynous.*
        - (1) Foliage glandular......................... RUTACEÆ, p. 189.
        - (2) Leaves ternate .... PTELEA, p. 188.
        - (3) Petals united .... HEATH-FAMILY, p. 163.
    - *d.* Stamens two or four (casually three), and *perigynous.*
        - (1) Sepals two .... PENÆA, p. 315.
        - (2) Flowers scarious .... PLANTAGO, p. 370.
        - (3) Petals free.
            - Stamens opposite petals .... RHAMNACEÆ, p. 311.
            - Stamens alternate with petals.......... CELASTRACEÆ, p. 310.
        - (4) Petals combined. *Stamens two.*
            - Albumen abundant and dense .... OLEACEÆ, p. 329.
            - Albumen little or none. (All exotics)..... JASMINACEÆ, p. 374.
        - (5) Petals combined. *Stamens four* .... HOLLY-FAMILY, p. 313—FORSYTHIA, p. 333—CALLICARPA, p. 396—BUDDLEA, p. 415.
    - *e.* Stamens six............................... CAPPARIDACEÆ, p. 210.
    - *f.* Stamens eight.
        - (1) Leaves glandular or covered with stellate hairs.. RUTACEÆ, p. 189.
        - (2) Flowers white and racemose. Leaves ovate. Tree.. STYRAX, p. 316.
        - (3) Leaves ternate, trifoliolate, or pinnate.
            - (*a*) Stamens hypogynous.
                - Stamens free...................... SAPINDACEÆ, p. 179.
                - Stamens forming a tube.................. MELIA, p. 191.
            - (*b*) Stamens perigynous .... WEINMANNIA, p. 305.
        - (4) Leaves opposite. Trees................ MAPLE-FAMILY, p. 176.
        - (5) Anthers opening by pores.
            - Anthers two-celled .... ERICACEÆ, p. 163.
            - Anthers four-celled .... TREMANDRACEÆ, p. 192.

J. Herbaceous plants.

- 1. Ovaries two or more, and *free.*
    - Leaves usually undivided .... CRASSULACEÆ, p. 158.
    - Leaves much divided...................... RANUNCULACEÆ, p. 91.
- 2. [Ovary solitary and conspicuously three-lobed.. EUPHORBIACEÆ, p. 608.]

CLASS X.—*Continued.*

- 3. Ovary solitary and simple, or apparently so.
    - *a.* Leaves fan-lobed ........................SANGUISORBACEÆ, p. 272.
    - *b.* Leaves twice-ternate. *Leaflets ciliated* ....EPIMEDIUM, p. 185.
    - *c.* Leaves only two, cordate and parallel-veined..MAIANTHEMUM, p. 628.
    - *d.* Two inner petals coherent at top. Stamens six..FUMARIACEÆ, p. 182.
    - *e.* Flowers in solid terminal heads. Leaves on stem. Both calyx and corolla ..........SANGUISORBACEÆ, p. 272—[MUSK-ROOT, p. 551.]
    - *f.* Leaves opposite.
        - Stigmas 2—5, linear, and usually white..CARYOPHYLLACEÆ, p. 192.
        - Stigma solitary and bifid. Plant bitter....GENTIAN-FAMILY, p. 322.
    - *g.* Leaves alternate. *Stamens hypogynous.*
        - (1) Stamens eight. Plant succulent ....ROSE-ROOT, p. 159.
        - (2) Leaves reniform. Stigmas tufted... MOUNTAIN SORREL, p. 217.
        - (3) Plant minute and repeatedly dichotomous....RADIOLA, p. 122.
        - (4) Leaves much-divided. Flowers yellow.....HYPECOUM, p. 184.
        - (5) Ovary one-seeded. Perianth single....CHENOPODIACEÆ, p. 225.
        - (6) Flowers cruciform.......................CRUCIFERÆ, p. 132.
    - *h.* Leaves alternate. *Stamens perigynous*.........CHAFFWEED, p. 348.

CLASS XI.

FLOWERS SIMPLE, BISEXUAL, REGULAR, AND PENTAMEROUS.—OVARY OR OVARIES "SUPERIOR."—STAMENS EXACTLY TEN.

- **A.** No green leaves at any time. Herbaceous plant........MONOTROPA, p. 172.
- **B.** Leaves all radical.
    - 1. Leaves oval or roundish.....PYROLACEÆ, p. 170—SAXIFRAGACEÆ, p. 297.
    - 2. Leaves formed of two folding plates...................DIONÆA, p. 181.
    - 3. Leaves trifoliolate ....OXALIS, p. 123.
    - 4. Leaves doubly-pinnatifid........................GERANIACEÆ, p. 115.
- **C.** Leaves binate, trifoliolate, or digitate.
    - Styles 3—5. Æstivation spiral..........................OXALIS, p. 123.
    - Style solitary. Æstivation imbricate ............ZYGOPHYLLACEÆ, p. 231.
- **D.** Ovary solitary; only one style, and only one stigma.
    - 1. Stamens hypogynous, and *free*, or only slightly monadelphous at the base.
        - *a.* Leaves dotted or glandular. Shrubs.
            - Fruit capsular ....RUTACEÆ, p. 189.
            - Fruit succulent..........................AURANTIACEÆ, p. 210.
        - *b.* Leaves dotless.
            - (1) Perianth single ....THYMELACEÆ, p. 233.
            - (2) Both calyx and corolla. Petals more or less united.
                - Shrubby ....ERICACEÆ, p. 163—STYRACACEÆ, p. 315.
                - Herbaceous ....PYROLACEÆ, p. 170.
            - (3) Both calyx and corolla. Petals free.
                - (*a*) Anthers opening by terminal pores.
                    - Style erect..ERICACEÆ, p. 163—TREMANDRACEÆ, p. 192.
                    - Style declinate ....PYROLACEÆ, p. 170.
                - (*b*) By slits...MALPIGHIACEÆ, p. 174—ZYGOPHYLLACEÆ, p. 231.

CLASS XI.—*Continued.*

2. Stamens hypogynous and conspicuously united.
   Filaments forming a tube......Meliaceæ, p. 191—Erica, (sp.) p. 169.
   Filaments polyadelphous ....Byttneriaceæ, p. 190.
3. Stamens perigynous (three of them without anthers)....Cassia, p. 268.

E. Ovaries 2—5 or more; or ovary solitary, and styles 2—5; or ovary and style solitary, and stigmas 2—5.

1. Ovaries five or more, free and distinct. Stigmas sessile. Petals entire.
   Petioles of the leaves dilated at the base....Ranunculaceæ, p. 91.
   Petioles (if any) not dilated. Leaves usually sessile. Whole plant very succulent......................Crassulaceæ, p. 158.
2. Flower consisting of calyx only.
   Stamens hypogynous. Style solitary....Phytolaccaceæ, p. 216—Geraniaceæ (casually), p. 115.
   Stamens perigynous. Styles two ....Scleranthus, p. 269.
3. Both calyx and corolla. *Stamens (or five of them) hypogynous.*
   a. Style solitary. Ovary lobed. Stigmas 2—5.
      Calyx imbricated ....Geraniaceæ, p. 115.
      Calyx valvate ....Tropæolaceæ, p. 152.
   b. Styles 2—5. Ovary solitary.
      (1) Leaves alternate. Ovary 3—5-celled..Oxalidaceæ, p. 123.
      (2) Leaves opposite or *quasi*-whorled. Placenta central.
      Caryophyllaceæ, p. 192—Illecebraceæ, p. 212.
      (3) Hothouse shrubs, often climbing or twining.
      Malpighiaceæ, p. 174.
4. Both calyx and corolla. *Stamens all perigynous.*
   a. Herbaceous plants.
      (1) [Ovary simple, half-inferior. Flowers green.
      Musk-root, p. 551.]
      (2) Ovary 2—3 lobed...............Saxifragaceæ, p. 297.
      (3) Ovary five-lobed ....Limnanthes, p. 153.
   b. Shrubs ....Hydrangeaceæ, p. 304—Cunoniaceæ, p. 305.

CLASS XII.

FLOWERS SIMPLE AND BISEXUAL.—COROLLA REGULAR AND PENTAMEROUS.—OVARY OR OVARIES "SUPERIOR."—STAMENS EXACTLY FIVE.

A. Plant living in water.

1. Ovaries numerous ....Ranunculaceæ, p. 91.
2. Ovary solitary.
   a. Leaves pectinate ....Water-featherfoil, p. 347.
   b. Leaves ternate. Petals bearded ....Bogbean, p. 324.
   c. Leaves circular ....Villarsia, p. 324.
   d. Leaves oblong...........................Polygonaceæ, p. 216.
   e. Rare little exotics.........................Droseraceæ, p. 180.

B. Trees, shrubs, and undershrubs, *without tendrils*, (the undershrubby ones sometimes trailing or scrambling).

1. Flowers appearing before the leaves............Elm-trees, p. 307.

CLASS XII.—*Continued.*

2. Flowers three together, an inch long, tubular, and surrounded by three great oval pink bracts....................BUGAINVILLEA, p. 225.
3. Stamens forming a cone that projects in the centre.
    - *a.* Stamens hypogynous. Greenhouse shrubs.
      BYTTNERIACEÆ, p. 190—PITTOSPORACEÆ, p. 189.
    - *b.* Stamens perigynous.
      Flowers glandular. Greenhouse plants..MYRSINACEÆ, p. 373.
      Flowers not glandular..................SOLANACEÆ, p. 333.
4. Calyx tubular and plaited. Stigmas five ...PLUMBAGINACEÆ, p. 356.
5. Leaves *quasi*-parallel-veined, hard and dry. Stamens epipetalous. Greenhouse evergreen shrubs..............EPACRIDACEÆ, p. 169.
6. Flowers in incurved racemes. Exotics........EHRETIACEÆ, p. 369.
7. Flowers minute, and surrounded by imbricated and coloured bracts.
   AMARANTH-FAMILY, p. 211.
8. Styles (or *sessile stigmas*) two, three, or five.
    - *a.* Leaves minute and appressed. Flowers small and racemose.
      TAMARICACEÆ, p. 175.
    - *b.* Perianth single. Leaves simple and undivided..ULMACEÆ, p. 307.
    - *c.* Both calyx and corolla.
      Leaves opposite........................STAPHYLEA, p. 181.
      Leaves alternate ....SUMACH-FAMILY, p. 214.
9. Style solitary. Flowers with both calyx and corolla.
    - *a.* Stamens hypogynous.
        - (1) Ovary simple.
            - (*a*) Foliage glandular ....RUTACEÆ, p. 189.
            - (*b*) Petals combined ....ERICACEÆ, p. 163.
            - (*c*) Petals free.................FRANKENIACEÆ, p. 105—PITTOSPORACEÆ, p. 189—BYTTNERIACEÆ, p. 190—VIOLACEÆ, p. 155—STERCULIACEÆ, p. 171.
        - (2) Ovary five-lobed. Stigmas five......GERANIACEÆ, p. 115.
    - *b.* Stamens perigynous.
        - (1) Petals more or less united.
          Stigma with a cup or flat plate immediately under it. Leaves opposite or whorled....APOCYNACEÆ, p. 316.
          Stigma simple. Leaves alternate. Flowers glandular.
          MYRSINACEÆ, p. 373.
        - (2) Petals free.
          Stamens opposite the petals ....RHAMNACEÆ, p. 311.
          Stamens alternate with the petals..CELASTRACEÆ, p. 310.

C. Shrubs with tendrils.

1. Leaves stipulate. Stamens and ovary on a thecaphore.
   PASSION-FLOWERS, p. 173.
2. Tendrils axillary. Petals minute....................VITACEÆ, p. 187.
3. Tendrils upon the leaves. Corolla large and bell-shaped...COBŒA, p. 361.

D. Plant herbaceous. *Stems twining or climbing.*

1. Leafless parasite. Stems as fine as hair..............DODDER, p. 344.

CLASS XII.—*Continued.*

2. Leafy plants.
a. Stamens hypogynous......................Pittosporaceæ, p. 189.
b. Stamens perigynous.
(1) Leaves opposite or whorled ....Apocynaceæ, p. 316.
(2) Leaves alternate.
Stigma cleft.....................Convolvulaceæ, p. 338.
Stigma simple ....Solanaceæ, 333.

E. Herbaceous plants, with the *leaves all radical.*
1. Leaves edged with glandular red hairs...............Sundews, p. 180.
2. Flowers pure white, with five palmate nectaries...Parnassia, pp. 298, 303.
3. Ovaries numerous..............................Mousetail, p, 93.
4. Ovary solitary.
Styles five..............................Plumbaginaceæ, p. 356.
Style solitary.
Stigmas two.........................Gentian-family, p. 322.
Stigma solitary and capitate............Primrose-family, p. 346.

F. Herbaceous plants, the leaves *not* exclusively radical.
1. Ovaries five or more, free and distinct.
Stamens hypogynous.......................Ranunculaceæ, p. 91.
Stamens perigynous ....Rosaceæ, p. 280.
2. Ovary two, four, or five-lobed. Stamens perigynous.
Ovary 2—3-lobed, the lobes divergent..........Saxifragaceæ, p. 297.
Ovary four-lobed. Petals united............Borage-family, p. 361—Ehretiaceæ, p. 369—Nolanaceæ, p. 374.
3. Ovary solitary and simple, or apparently so.
a. Perianth single.
Stamens hypogynous...Glaux, p. 350—Amaranth-family, p. 211—Spinach-family, p. 225—Nyctaginaceæ, p. 224—Polygonaceæ, p. 216—Illecebraceæ, p. 212.
Stamens perigynous......................Scleranthus, p. 269.
b. Both calyx and corolla. *Stamens hypogynous.*
(1) Sepals two.........................Portulacaceæ, p. 214.
(2) Sepals five.
(a) Corolla large and white, with five palmate and beaded nectaries.....................Parnassia, pp. 298, 303.
(b) Styles 2—5. Stigmas linear....Caryophyllaceæ, p. 192.
(c) Styles five. Stigmas capitate.......Flax-family, p. 121.
(d) Style solitary. Stigmas 3—5.....Frankeniaceæ, p. 105—Geraniaceæ, p. 115.
(e) Leaves minutely stipulate ....Illecebraceæ, p. 212.
c. Both calyx and corolla. *Stamens perigynous.*
(A) Styles 2—3—5....................Plumbaginaceæ, p. 356—Hydrophyllaceæ, p. 372.
(B) Style solitary. *Stigma with a plate or cup below it.* Leaves opposite or whorled. Corolla rotate. Æstivation spiral. Apocynaceæ, p. 316.

CLASS XII.—*Continued.*

(c) Style solitary. Stigmas 2—3, *side-by-side.*
- (1) Plant bitter. Leaves opposite............GENTIAN-FAMILY, p. 322.
- (2) Not bitter.
  - Stigmas two.......................CONVOLVULUS-FAMILY, p. 338—HYDROPHYLLACEÆ, p. 372.
  - Stigmas three ....POLEMONIACEÆ, p. 359.

(D) Style solitary. Stigma simple.
- (1) Anthers coherent ....GLOXINIA, p. 419.
- (2) Anthers free.
  - (*a*) Leaves opposite, and with interpetiolar stipules. LOGANIACEÆ, p. 328.
  - (*b*) Stamens opposite the petals.........PRIMROSE-FAMILY, p. 346.
  - (*c*) Æstivation plaited......................SOLANACEÆ, p. 333.
  - (*d*) Æstivation imbricated ............SCROFULARIACEÆ, p. 397.

CLASS XIII.

FLOWERS SIMPLE AND BISEXUAL.—PERIANTH REGULAR AND PENTAMEROUS.—OVARY "SUPERIOR."—STAMENS ANY NUMBER UNDER TEN, *except five.*

A. Trees, shrubs, and climbing plants.
- 1. Flowers brown, in dense round clusters, and appearing before the leaves. Perianth single................................ELM-TREES, p. 307.
- 2. Stamens hypogynous.
  - *a.* Leaves opposite.
    - Disk very large. Ovary two-lobed ....MAPLE-FAMILY, p. 176.
    - No disk. Ovary five-lobed. Stigmas five. Stamens slightly monadelphous.......................GERANIUM-FAMILY, p. 115.
  - *b.* Leaves alternate.
    - (1) Perianth single ....POLYGONACEÆ, p. 216.
    - (2) Both calyx and corolla.
      - Stamens slightly monadelphous....GERANIUM-FAMILY, p. 115.
      - Stamens free ...................XANTHOXYLACEÆ, p. 188.
- 3. Stamens perigynous.
  - *a.* Perianth single. Styles two.....................ULMACEÆ, p. 307.
  - *b.* Both calyx and corolla.
    - Petals free ....PEA-FAMILY, p. 238.
    - Petals united.........JASMINACEÆ, p. 374—VERBENACEÆ, p. 394—SCROFULARIACEÆ, p. 397—BIGNONIACEÆ, p. 415.

B. Herbaceous plants.
- 1. Leaves fringed with glandular red hairs, and all radical..SUNDEW, p. 180.
- 2. Perianth single. Leaves with ocreate stipules....POLYGONACEÆ, p. 216.
- 3. [Flowers apparently consisting of a coloured or green calyx only. Ovary 3-lobed................................SPURGE-FAMILY, p. 608.]
- 4. Both calyx and corolla, and the petals *free.*
  - *a.* Sepals two. Stamens three......................BLINKS, p. 214.

CLASS XIII.—*Continued.*

- *b.* Ovary solitary.
  - (1) Ovary simple. Leaves opposite. Styles 2—5.
    Caryophyllaceæ, p. 192—Illecebraceæ, p. 212.
  - (2) Ovary three-lobed. Leaves alternate....Tropæolaceæ, p. 152.
  - (3) Ovary five-lobed. Stigmas five.... Geranium-family, p. 115.
- *c.* Ovaries several and distinct.
  - (1) Stamens perigynous. Sepals ten........Rose-family, p. 280.
  - (2) Stamens hypogynous.
    - Leaves all radical ....Mousetail, p. 93.
    - Stem leafy. Stigmas five........Stonecrop-family, p. 158.

5. Both calyx and corolla, and the petals *united*, or at least at the base.
   Labiatæ, p. 376—Scrofulariaceæ, p. 397—Bignoniaceæ, p. 415—Gesneraceæ, p. 419—Acanthaceæ, p. 417.

CLASS XIV.

FLOWERS SIMPLE AND BISEXUAL.—STAMENS NOT MORE THAN TEN.—OVARY OR OVARIES SUPERIOR.—PERIANTH WITH THE PARTS *in sevens*.—HERBACEOUS PLANTS.

A. Ovaries numerous and free.........................Crassulaceæ, p. 158.

B. Ovary solitary.

- Plant erect. Flowers white ....Trientalis, p. 349.
- Plant prostrate or trailing. Flowers yellow ....Disandra, p. 415.

CLASS XV.

Flowers simple and bisexual. Stamens not more than ten. Ovaries superior. Perianth of more than ten pieces ....Chimonanthus, p. 236.

CLASS XVI.

Flowers incomplete, *i.e.*, either totally destitute of perianth, or having the stamens and pistils protected only by bracts. (The bracts, when present, usually solitary, often exceedingly minute, sometimes chaff-like, occasionally petaloid and coloured.)

A. Trees and shrubs.

1. Greenhouse tree, never producing leaves............Casuarina, p. 617.
2. Flowers appearing previously to the leaves.
   - *a.* Flowers in panicles ....Ash-tree, p. 330.
   - *b.* Flowers in little globular clusters...Larch (male flowers), p. 770.
   - *c.* Flowers in pink rudimentary cones.
     Larch (female flowers), p. 770.
   - *d.* Male flowers in catkins; female flowers in separate buds, and upon the same tree ....Oak-family, p. 567.
   - *e.* Male flowers in catkins; female flowers also in catkins.
     - Monœcious.......................Birch-tree-family, p. 576.
     - Diœcious ....Poplar, p. 580—Sweet-gale, p. 598.

CLASS XVI.—*Continued.*

3. Flowers in company with opening leaves or with fully-developed leaves.

a. Leaves needle-shaped........................Coniferæ, p. 762.

b. Leaves extremely minute, and closely appressed to the twigs.
Cupressineæ, p. 766.

c. Leaves oblong-linear, dark-green, and the surfaces all turned upwards. Evergreen trees....Yew-tree, p. 773—Coniferæ, p. 762.

d. Leaves simple, more or less lanceolate or oval.

(1) Male flowers in catkins, females in buds..Oak-family, p. 567.

(2) Both male and female in catkins. Diœcious..Willows, p. 584.

(3) Flowers not in catkins................Euphorbaiceæ, p. 608.

e. Leaves simple, cordate, rough, 2–3 inches across..Mulberry, p. 607.

f. Leaves simple and lobed.

Sap milky.............Fig-tree, p. 605—Spurge-family, p. 608.

Sap not milky............................Plane-tree, p. 596.

g. Leaves pinnate.

Leaves aromatic. Flowers in catkins.
Walnut (male flowers), p. 595.

Flowers not in catkins........................Suamch, p. 215—
Euphorbiaceæ, p. 608—Cycadaceæ, p. 774.

B. Herbaceous plants.

1. Aquatic.

a. Plant stemless, consisting only of horizontal green plates ⅛—¼ inch across, and attached by their margins.........Duckmeat, p. 706.

b. Plant with a distinct stem and leaves.

(A) Leaves undivided.

(1) Upper leaves in rosettes......Water Star-weed, p. 619.

(2) Leaves in numerous whorls, 1—2 inches long. Stems erect and emerged ....Marestail, p. 491.

(3) Leaves 1—4 feet long, narrow, and erect. Stems emerged, 2—6 feet high.

(a) Flowers in dense, solitary, and terminal clubs, several inches long.............Typha, p. 702.

(b) Flowers in many globular heads.
Water-burr, p. 703.

(c) Flowers in loose panicles, open spikes, or catkins.

Sheath of leaves tubular..Sedge-family, p. 740.

Sheath of leaves open down one side.
Grass-family, p. 707.

(4) Leaves grass-like and submerged or floating.
Naiadaceæ, p. 676—Typhaceæ, p. 702—
Grass-family, p. 707.

(5) Leaves ovate or oblong, &c...........Naidaceæ, p. 676—
Lemnaceæ, p. 705.

(B) Leaves divided.

Leaves pectinate............Water-featherweed, p. 491.

Leaves forked ....Water-hornwort, p. 620.

CLASS XVI.—*Continued.*

2. Seashore mud plant, without leaves................Saltwort, p. 228.
3. Dry-land plants.
    - *a.* Flowers upon a spadix.
        - A large spathe also......................Arum-family, p. 696.
        - No spathe................................Piperaceæ, p. 232.
    - *b.* Stems twining.
        - Flowers in green cones............Hop (female plant), p. 604.
        - Flowers not in cones...................Euphorbiaceæ, p. 608.
    - *c.* Leaves net-veined.....Urticaceæ, p. 601—Euphorbiaceæ, p. 608—Dorstenia, p. 606.
    - *d.* Leaves linear, parallel-veined, and with sheaths.
        - Sheath tubular.........................Sedge-family, p. 740.
        - Sheath open down one side...............Grass-family, p. 707.

CLASS XVII.

FLOWERLESS PLANTS.

A. Plant with distinct roots or rootstock, and leaf-like fronds or green branches.

1. Fructification on the under-surface of the frond.........Ferns, p. 776,
2. Fructification in terminal spikes.
    - *a.* Stem leafless, or with whorled branches, or with sheaths at the joints. Horsetails, p. 800.
    - *b.* Stem clothed with abundance of small green leaves. Lycopodium, p. 807.
    - *c.* Stem with one large leaf below the spike...Adder's-tongue, p. 790.
3. Fructification in terminal panicles..................Osmunda, p. 789—Moonwort, p. 790.
4. Fructification in the axils of minute leaves, or upon the general upper-surface of the plant.
    - *a.* Thecæ sessile. Land plants............Lycopodium, p. 807—Ricciaceæ, p. 818.
    - *b.* Thecæ sessile. Pondside or aquatic plants. Pillwort & Quillwort, p. 817.
    - *c.* Thecæ stalked.
        - Opening with a lid........................Mosses, p. 811.
        - Opening with four or eight valves..Marchantia-family, p. 817.

B. No distinct roots or rootstock.

1. Water-plants (usually), and in many cases green. Chara & Seaweed-families, pp. 830, 831.
2. Land plants, very rarely green.
    - Usually dry and crisp...........................Lichens, p. 819.
    - Usually spongy or watery.........................Fungi, p. 824.

BRITISH AND GARDEN BOTANY.

PERFECT, OR FLOWERING PLANTS.

CLASS I.—EXOGENS.

SECTION 1.—BISEXUAL EXOGENS.

GROUP I.—OVARY FREE AND ENCLOSED; STAMENS UPON THE RECEPTACLE.

I. THE WATER-LILY FAMILY.—*Nymphæa'ceæ.*

Strikingly beautiful and conspicuous aquatic plants, found in clear lakes and ponds and in quiet rivers, throughout the northern hemisphere. Root-stock embedded in the mud at the bottom. Leaves oval or circular, seldom less than nine inches long and broad, undivided, leathery, and supported on petioles as many feet long as the water is deep; the lamina usually floating upon the surface. Flowers on radical peduncles, solitary, 2—12 inches across, regular, white, yellow, rose-coloured or blue, and, for the most part, anchored far from land.—Sepals few; petals and stamens numerous, the latter often about seventy; carpels numerous, either combined into a many-celled ovary, or free, but embedded in the receptacle, which then forms a peculiar fleshy covering to them. In either case the stigmas are sessile, and form a radiating crown upon the summit of the central mass.

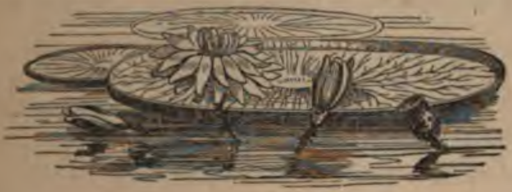

Fig. 87.
Victo'ria re'gia, the largest known water-lily.

Of these beautiful plants there are known about fifty species. None are of particular value economically, but their splendour gives to several a place in every conservatory where space can be afforded for tanks or miniature ponds. The most esteemed in cultivation are the blue-flowered *Nymphæ'a cœru'lea* (Bot. Mag. xvi. 552.) and the red-flowered *Nymphæ'a Lo'tus* and *Nymphæ'a ru'bra* (xxi. 797, xxxi. 1280.)—*Eury'ale fe'rox*, sometimes called *Annes'lea spino'sa* (xxxv. 1447.) has the petioles and and calyces covered with stiff prickles. The acmé of magnificence is attained in the *Victo'ria re'gia* of Guiana, at once the largest and probably the best-known of exotic water-lilies, alike in its majestic flowers, and prodigious leaves, the latter shaped like oval tea-trays, with raised edges, and strong enough, when full-grown, to sustain the weight of a child.

Two species grow wild in Britain.

1. Flowers white, rose-like, 4—5 inches across, floating upon the surface of the water, scentless, and closing at sunset. Sepals four, flat, green upon the outside, but upon the inner surface white, like the petals, which they equal in size. Inner petals gradually passing into stamens, making the flower appear double. Carpels embedded in the receptacle, which protrudes above them in the centre. Fruit resembling a small poppy-head. WHITE WATER-LILY.
2. Flowers yellow, two inches across, raised a hand's-breadth above the surface, and with the odour of brandy or ratafia. Sepals 5—6, circular, concave, much larger than the petals, and rendering the flower nearly globular. Ovary compound. Fruit shaped like the bulb of a narcissus. YELLOW WATER-LILY.

HABITATS AND DISTRIBUTION.

1. WHITE WATER-LILY—*Nymphæ'a al'ba.*

Lakes, clear ponds, and slow, sequestered rivers, especially in their shallow marginal recesses; common. Fl. July, August.

Curtis, iii. 500; E. B. iii. 160; Baxter, iii. 181, 182.

2. YELLOW WATER-LILY—*Nu'phar lu'tea.*

Similarly diffused, and in many instances more abundant. Fl. June—August.

Curtis, iii. 501; E. B. iii. 159 (as *Nymphæ'a lu'tea*); Baxter, iv. 281, 282.

A small variety, with leaves about three inches long, found in the lakes of the north of Scotland, is distinguished by some botanists under the name of the Highland Water-lily or *Nu'phar pu'mila.* (Curtis, iv. 619.) The only technical difference is in the form of the stigma-crown, the border of which is green and sharply-notched. It is the same as the *Nu'phar min'ima* of E. B. xxxii. 2292.

When out of bloom, these two plants may be distinguished by their leaves.—Those of the white water-lily are roundish egg-shaped, usually purplish on the under surface; the lobes at the base are contiguous and almost parallel, and the petiole is *cylindrical.* Those of the yellow are oval, pointed rather than rounded; the lobes are somewhat divergent, and the petiole is *angular*, especially at the upper part. In both species the fruit attains maturity under water, attacked meanwhile by fish, for the sake of the seeds.

II. THE NELUMBIUM FAMILY—*Nelumbia'ceæ.*

In their general character and habitats the Nelumbiaceæ resemble the water-lilies. Belonging chiefly to the East Indies, we know little of them in Great Britain, almost the only representative seen in cultivation being the celebrated *Nelum'bium specio'sum*, (Bot. Mag. xxiii. 903, lxviii. 3916.) the flower of which is intended in the mystic Lotus of the monuments of Egypt and India. Upon these ancient sculptures it often appears blended with ears of corn, to form the insignia of Isis. The seeds were probably the "Egyptian beans" of Pythagoras. This noble plant is no longer an inhabitant of the Nile, though plentiful in China and other parts of eastern Asia. The flowers and peltate leaves rise vertically several feet above the water, and strike the attention of every visitor to Kew and Chatsworth. *Nelum'bium lu'teum* from North America, resembles a double yellow tulip. The flowers are 3—4 inches across; the leaves are perfectly circular, peltate, and 12—18 inches in diameter.

III. THE CEPHALOTUS FAMILY.—*Cephalota'ceæ.*

This family consists, so far as at present known, only of a curious Australian genus of "pitcher-plants," one species of which, the *Cephalo'tus follicula'ris*, (Bot. Mag. lviii. 3118.) is not uncommon in good conservatories. The leaves are all radical, broadly elliptic, with numerous little vegetable pitchers about an inch and a half in length interspersed, and a scape of small white blossoms rising from the centre of the tuft. The flowers are trimerous, and consist of calyx only, with twelve stamens, and an ovary of six distinct carpels.

IV. THE BUTTERCUP FAMILY.—*Ranuncula'ceæ.*

Herbaceous plants (excepting most kinds of *Cle'matis*, the half-shrubby Chinese pæonies, and one or two others) with simple and usually much-divided leaves, the petioles, which are usually long, without stipules, but usually dilated at the base; the juices thin, watery, and usually acrid. Sepals and petals usually five each, and the flowers for the most part regular; sometimes widely otherwise, and with as few as three sepals, and as many as nine or ten petals. Stamens seated on the receptacle, 5, 10, or 20—100 or more, the higher numbers predominating. Ovaries 1—100, the higher numbers again most frequent, perfectly free, except in the exotic genus *Nigel'la*, which is distinguished by their cohesion as far as the middle. Fruit consisting in general either of many-seeded follicles, as in the pæony, which gives a remarkably fine example; or of achenia, disposed upon the enlarged and elevated receptacle, and in the clematis, the Pasque-flower, and some anemones, provided with hairy tails. No family presents more anomalies of structure in regard to the flowers, or facts more perplexingly at variance with our preconceived ideas of calyx and corolla. To the student of vegetable homology it is, consequently, most instructive. *Ranunc'ulus a'cris* and *auric'omus* show the tendency of the calyx to become petaloid; in *Helleb'orus* and *Aconi'tum* the sepals assume the appearance of a corolla, and the petals are reduced to little honey-cups; in *Cle'matis*, *Anemo'ne*, and *Cal'tha*, the flower consists of petaloid calyx only, the petals being entirely absent, and the sepals brilliantly developed in their stead. Now and then, as in *Xanthorhi'za* and the *Ranunc'ulus hedera'ceus*, there are only five stamens to a much larger number of pistils, a condition scarcely met with anywhere else, though in direct and very curious analogy with that of the endogenous genus *Alis'ma*, which also reverses the usual numerical proportion, and in habit of growth bears a further resemblance to ranunculaceous plants. A strong tendency to become double is manifested both in the regularly-formed flowers and in the irregular. The blossoms seldom yield any perfume, and are of every known colour.

The species, of which there are about a thousand, are natives principally of northern temperate latitudes, and adorn them everywhere, from the beginning of spring till the end of summer, with bright and copious bloom. Few families are more abundantly represented, or do more for the embellishment of their native soil. But alas for gay attire; not a single species is fit for food, or of other economic service, while their general properties are caustic and poisonous. The spear-wort and celery-crowfoot of our ditches will blister the skin; and the hellebores and the aconites, taken internally, are fatal. None are worse in this respect than the common monkshood, the roots of which, mistaken for horseradish, have frequently caused death. The properties in question have given the family repute in medicine; but although used from the earliest times, few species appear to be really serviceable.

In Britain there grow wild, or as colonists, thirty-four. Two others, the Grass-leaved Crowfoot (*Ranunc'ulus gramin'eus*, E. B. xxxiii. 2306.) and the White Mountain Crowfoot, (*Ranunc'ulus alpes'tris*, E. B. xxxiv. 2390.) were formerly included in British Floras, but are not native.

A.

ANTHERS YELLOW, SO LONG AND LARGE AS NEARLY TO OVERWHELM AND CONCEAL THE PERIANTH, which consists of *calyx only*. LEAVES TWICE AND THRICE TERNATE; the leaf-stalk divided into distinct branches. STEMS ERECT. OVARIES FEW, ripening into achenia.

a. Stem simple, seldom six inches high. Flowers pendulous; perianth whitish; stamens 8—20. Leaves mostly radical. Achenia 2—3.
21. ALPINE MEADOW-RUE.

b. Stem branched, 15—50 inches high, and usually zigzag. *Anthers pendulous.* Sepals four, pale purple, with white edges, or purplish-green. Leaflets roundish. Flowers in spreading panicles, and drooping when fully expanded. Achenia 4—5.
22. SMALL MEADOW-RUE.

c. Stems branched, 2—4 feet high. *Anthers erect,* yellow, looking innumerable. Leaflets obovate or wedge-shaped. (Fig. 33, p. 18.) Flowers very numerous, in close panicles, the perianth cream-coloured.
23. COMMON MEADOW-RUE.

B.

PERIANTH NOT CONCEALED BY THE STAMENS. *Flowers wholly yellow.*

a. Leaves linear, lanceolate, or ovate-lanceolate, and undivided. Ovaries short and thick, ripening into achenia.

Leaves all radical. Peduncles radical, 2—5 inches high, one-flowered. Sepals, petals, and stamens 5—7. Ovaries forming a close and slender spike, which when ripe is 1—3 inches long, and resembles the tail of a mouse.
20. MOUSETAIL.

Stem leafy.

Flowers an inch across, and very showy. Stem 2—3 feet high.—Leaves sessile, 6—8 inches long.
8. GREAT SPEAR-WORT.

Flowers not exceeding half-an-inch across. Stems 8—20 inches high.

Petals much longer than the calyx. Leaves mostly narrow, petiolate. Stem reclining at the base.
9. COMMON SPEAR-WORT.

Petals scarcely exceeding the calyx. Leaves mostly ovate-lanceolate. Stem erect.
10. ADDER'S-TONGUE SPEAR-WORT.

b. All the leaves heart-shaped and undivided. Flowers brilliant yellow and very conspicuous. Plant glabrous and succulent.

Sepals five or six, resembling petals, broad and oval; corolla absent; peduncles short, 1—3 flowered; ovaries long and narrow, and becoming many-seeded follicles.
24. MARSH-MARIGOLD.

Sepals three, yellowish-green; petals about nine, long and narrow; peduncles 4—5 inches long, one-flowered; ovaries short and thick, and becoming achenia.
19. PILE-WORT.

c. Upper leaves deeply and variously divided, fan-lobed or pinnatifid.

* *Ovaries in an oval head, which is longer than the petals, and projects beyond the corolla.* Petals very small. Stamens 10—20. Plant succulent, 1—2 feet high, glabrous and glossy. Ripe achenia very small.
18. CELERY-CROWFOOT.

(PERIANTH NOT CONCEALED BY THE STAMENS. *Flowers wholly yellow.* Upper leaves divided, fan-lobed or pinnatifid.)

** *Ovaries not in a projecting head.*

I. Flowers globular; sepals 12—14, large, concave, pale-yellow, *concealing the stamens* and the 9—16 minute and linear petals. Ovaries long and narrow, becoming follicles. Seeds minute. Plant glabrous. 25. GLOBE-FLOWER.

II. Flowers open, more or less cup-shaped. Perianth usually large, and *not concealing the stamens.*

A. Flower solitary, consisting of 5—8 narrow and yellow sepals, and many minute and tubular petals. Two deeply-cut and sessile leaves forming a frill immediately below it. Leaves deeply cut. Scape 3—6 inches high. 32. WINTER-ACONITE.

B. Flower usually solitary, formed of 5—8, but usually five, elliptical and bright yellow sepals. No petals. Leaves ternate and cut. Scape 3—6 inches high. 2. YELLOW SYLVAN ANEMONE.

C. Flowers many together on the stem, and consisting (unless casually imperfect) of both calyx and corolla. Sepals five. Petals usually five, not tubular. No involucrum below the flower.

Calyx reflexed.

Root resembling a little turnip, solid and perennial. Petals circular. Peduncles furrowed. Flowers brilliant, and as if burnished. 14. TURNIP-ROOTED BUTTERCUP.

Root fibrous and annual. Flowers pale. 15. PALE HAIRY CROWFOOT.

Calyx spreading or concave.

Some of the stems erect; the others prostrate, creeping, and rooting at the joints like the runners of a strawberry. Peduncles furrowed. 13. CREEPING BUTTERCUP.

Stems weak, all nearly prostrate; leaves roundish; whole plant hairy; annual; petals minute and narrow, often only three or four. 17. SMALL-FLOWERED CROWFOOT.

Stems all erect.

Plant hairy; petals round and shining; peduncles not furrowed. 12. COMMON MEADOW BUTTERCUP.

Plant glabrous or nearly so.

Leaves all deeply cleft; achenia 3—5, large and prickly. Annual. 16. CORNFIELD CROWFOOT.

Lower leaves circular, and broadly crenate; achenia small, without prickles. Petals sometimes absent. Perennial. 11. EARLY SYLVAN CROWFOOT.

C.

PERIANTH NOT CONCEALED BY THE STAMENS. *Flowers not yellow, or yellow only in the centre.*

- I. Stems shrubby, very tough, climbing to the height of 10—20 feet, and much entangled. Leaves *quasi*-pinnate, their petioles twisting so as to serve as tendrils, and remaining after the fall of the leaflets, which are about five in number, ovate and pointed. Flowers greenish-white, in open panicles.—Sepals usually four. Petals absent. Achenia with silky and wavy tails 1—1½ inch in length. 27. CLEMATIS.
- II. Stems herbaceous.
  - * Flowers irregular. Sepals resembling petals.
    - Upper sepal helmet-shaped and concealing two of the petals, which are converted into honey-cups. Flowers deep violet-blue, in a dense, terminal, erect, and nearly simple raceme. Stems 3—5 feet high, Leaves as in Fig. 30, p. 16. 28. MONKSHOOD.
    - Upper sepal with a long, straight, and hollow spur. Flowers few, blue or reddish, in a thin upright raceme. Stems 1—2 feet high. Leaves cut into linear segments. Follicles as in Fig. 81, p. 85. 33. CORNFIELD LARKSPUR.
  - ** Flowers regular.
    - A. *Flower silky upon the outside*, composed of six large dull-violet sepals. Petals absent. Involucrum large and pinnatifid, the segments linear. Stem 4—8 inches high, one-flowered. Leaves cut into linear segments. Achenia with feathery tails 1½ inch long.—Plant covered with long soft hairs. 4. PASQUE-FLOWER.
    - B. *Petals five, tubular, and ending in curved spurs*, the general form being that of a cornucopia. Sepals flat, coloured, and resembling petals. Flowers blue, purple, or dull red. Leaves thrice ternate, on petioles 5—9 inches long, the lobes roundish and entire. Stems 2—3 feet high. Ovaries about five, long and slender. 26. COLUMBINE.
    - C. *Flowers not silky. Petals, if any, not spurred.*
      - *a.* Flowers scarlet, half an inch broad. Petals 6—10. Ovaries numerous and forming an oblong head. Leaves thrice-pinnatifid, the segments linear. Stems 6—18 inches high, and much branched. 5. PHEASANT'S-EYE.
      - *b.* Flowers deep red, 3—4 inches across. Petals about five. Ovaries 2—5, large and downy. Leaves doubly-ternate, the lobes deep, ovate, and cut. 29. WILD PÆONY.
      - *c.* Flowers green, or whitish-green. Sepals five, large. Petals 8—10, minute and tubular. Leaves palmate or pedate. Ovaries long and slender.
        - Sepals concave, dull red at the edges. Flowers globular, in a large panicle, half-pendulous. 31. FŒTID HELLEBORE.
        - Sepals spreading. Flowers three or four. 30. GREEN HELLEBORE.
      - *d.* Flower bright blue, solitary, consisting of 10—14 lanceolate sepals. Petals absent. 3. BLUE MOUNTAIN ANEMONE.

(PERIANTH NOT CONCEALED BY THE STAMENS. Stems herbaceous. Flowers regular, *neither yellow nor silky. Petals not spurred.)*

e. Flowers white or purplish. *Stems erect.* Dry land plants.
  Flower solitary and terminal. Sepals 5—9, usually six, lanceolate; petals absent. Leaves ternate and cut. Achenia numerous, green, and downy. 1. WOOD ANEMONE.
  Flowers small and racemose. Sepals four; petals four. Fruit a black berry. Stem triangular. 34. BANEBERRY.

f. Flowers white, often yellow in the centre. *Stems prostrate*, floating in water, or creeping upon mud.
  Stamens 20—40. Plant always floating in water. Submerged leaves cut into hair-like segments; floating ones 3—5-lobed, in some varieties absent. Flowers conspicuous. 6. WATER SNOW-CUPS.
  Stamens 5—10. Plant usually creeping on mud. All the leaves 3—5-lobed. Flowers minute. 7. FROG-WORT.

HABITATS AND DISTRIBUTION.

1. WOOD ANEMONE—*Anemo'ne nemoro'sa.*

One of the grand, sweet prodigalities of nature, filling every wood and little copse in early spring with its graceful, half-pendulous white flowers. Often grows also in the open fields, but the flowers are then not so large, and the foliage has a purple tinge.

Curtis, i. 111; E. B. v. 355; Baxter, i. 43.

The flowers are frequently of a deep lilac colour, especially on the outside, and occasionally even blue; sometimes also double, and now and then with the white sepals half-converted into pinnatifid green leaves. They close in wet and cloudy weather, and are followed by abundance of ripe fruit, growing in a round head, upon the extremity of the curved peduncle.

2. YELLOW SYLVAN ANEMONE—*Anemo'ne Ranunculoi'des.*

Naturalised in woods in Kent, Surrey, and Hertfordshire; and in meadows, and even by roadsides, in Norfolk and other eastern counties. Fl. April.

E. B. xxi. 1484.

3. BLUE MOUNTAIN ANEMONE—*Anemo'ne Apenni'na.*

Naturalised in woods and plantations in several parts of the south and east of England, and at Cullen in Banffshire. Fl. March—May.

Curtis, ii. 399; E. B. xv. 1062.

Occasionally in gardens. A very beautiful spring flower.

4. PASQUE-FLOWER—*Anemo'ne Pulsatil'la.*

Pastures and hill-sides where the soil is chalky, or upon limestone; rare. Cambridgeshire and other eastern counties. Fl. April, May.

Curtis, iii. 502; E. B. i. 51 (coloured crimson.)

Common in gardens, the leaves scarcely developed till the flowers are gone and the seed is ripe.

5. Pheasant's-eye—*Ado'nis autumna'lis.*

Cornfields, chiefly in the south; but not to be depended on, being of exotic origin, and probably brought in with seed-corn, or accidentally discharged from gardens. In Kent not uncommon. Fl. July—Oct. Annual.

Curtis, i. 110; E. B. v. 308; Baxter, i. 7.

A very old and favourite annual in gardens, under the name of "Flos Adonis."

6. Water Snow-cups—*Ranunc'ulus aquat'ilis.*

Ponds, clear ditches, and slow rivers, usually floating upon the surface, but occasionally altogether submerged; common. Fl. May, June, and in relics till the end of autumn.

E. B. ii. 101.

The only British Ranunculus that floats in water, from which circumstance, in connection with the similarity of its blossoms, it is in some parts of the country called the water-anemone. Few plants make a more beautiful show in their season. At the end of May, when the snowy flowers are in perfection, they form patches many feet across, growing as close together as plum or cherry bloom.

The leaves, as happens with many other exogenous aquatics, vary a good deal; the flowers also are susceptible of change to a slight extent. Hence, with some botanists, besides the normal form, not less than nine or ten others have been described as species, viz.:—

Ranunc'ulus circina'tus (E. B. Supp. iv. 2869.)—Floating leaves none. Submerged leaves circular in outline, the segments short, and all spreading in one plane.

——— *flu'itans* (E. B. Supp. iv. 2870.)—Floating leaves none. Submerged leaves 5—6 inches long, the segments parallel. Chiefly in rivers and running water.

——— *trichophyl'lus, Drouet'ii, confu'sus, Baudo'tii, floribun'dus, heterophyl'lus,* and *pelta'tus,* concerning which see Babington's "Manual."

Individuals without any broad and floating leaves constitute the old *Ranunc'ulus pan'tothrix.*

7. Frog-wort—*Ranunc'ulus hedera'ceus.*

On the mud bordering slow and shallow rivulets, and where water has stood during winter, and left a wet hollow, which it often covers with a green mat; common everywhere. Occasionally floating. Fl. spring and summer; and, when the season is mild, beginning in midwinter.

Curtis, ii. 259; E. B. xxviii. 2003.

The leaves, which often have a black and lunate spot in the centre, seem a miniature terrestrial ivy.

A variety larger in all its parts, and a horn to every achenium, has been distinguished as *R. cœno'sus.* (E. B. Supp. iv. 2930, as *R. Lenorman'di.)* Both forms are probably only modifications of *R. aquat'ilis,* and connected with it probably through the *Ranunc'ulus triparti'tus* of E. B. Supp. iv. 2946.)

8. GREAT SPEAR-WORT—*Ranunc'ulus Lin'gua.*

Marshy places; on the borders of reedy pools, especially under trees, and upon the edges of lakes; rather rare. Chiefly in the north of England, and near Manchester not uncommon. Fl. July, August.

Curtis, iv. 622; E. B. ii. 100.

9. COMMON SPEAR-WORT—*Ranunc'ulus Flam'mula.*

Ditches and marshy places; everywhere. Fl. July, August; in forward seasons as early as May, and lasting, in remnants, throughout the autumn.

Curtis, ii. 401; E. B. vi. 387.

When accidentally in dry ground, the plant becomes half-trailing, and the leaves linear. A variety with slender, creeping stems, and small flowers, found chiefly upon the margins of the Highland lakes, has been named *Ranunc'ulus rep'tans.*

10. ADDER'S-TONGUE SPEAR-WORT—*Ranunc'ulus ophioglossifo'lius.*

"St. Peter's Marsh, Jersey." Fl. June. Annual.

E. B. Supp. iii. 2833.

11. EARLY SYLVAN CROWFOOT—*Ranunc'ulus auric'omus.*

Borders of dry woods, hedgebanks, and similar shady places; not uncommon, except in Scotland. Fl. end of April to end of May.

Curtis, i. 114; E. B. ix. 624.

The only British Ranunculus that grows habitually in the shade of trees, and the most elegant of our native species. The stems are usually about a foot high, erect and branched: the root-leaves on long stalks, circular, with a few broad round lobes, and the margin crenulate; the stem-leaves few and sessile, and divided to the base into narrow segments, thus presenting the curious spectacle, as in the *aquat'ilis,* of two varieties of foliage upon the same plant. The flowers that first open are frequently without petals; those that follow have often not more than two or three; the full number of five appearing only when the season is somewhat advanced. The absence of petals in the earlier flowers is compensated by the large and erect yellow sepals. The delicate slenderness and the glossy and yellowish hue of the herbage, coupled with the colour of the flowers, gained for it with the early botanists the name of "goldilocks," of which "*auric'omus*" is the Latin. It is one of the few species that are not acrid, whence they also called it Ranunculus *dul'cis.*

12. COMMON MEADOW BUTTERCUP—*Ranunc'ulus a'cris.*

Everywhere in meadows and pastures, and upon lawns and grass-plots. Fl. May—July; in fine seasons coming in April, and often re-appearing in October.

Curtis, i. 39; E. B. x. 652; Baxter, iv. 302.

One of the lowland plants that sometimes climb to the tops of the highest mountains, there rising only a few inches in height, and the stem bearing a solitary flower. The fruits ripen abundantly, forming small brownish-black heads, which fall apart when touched, and well illustrate the nature of achenia.—

They are to be looked for in September, in old pastures, where the cattle have not cared to eat the stems. A double variety, figured in Bot. Mag. vii. 215, is common in gardens under the name of "Yellow Bachelors' Buttons." The "White Bachelors' Buttons" is the *Ranunc'ulus aconitifo'lius* of the Alps, (Bot. Mag. vi. 204.) by some called "Fair-maids-of-France," a plant with fan-lobed, angular leaves, and spreading corymbs of double blossoms.

13. Creeping Buttercup—*Ranunc'ulus re'pens.*

Everywhere by waysides and in fields, and a common weed in neglected gardens. Fl. June—August.

Curtis, ii. 258; E. B. viii. 516.

Remarkable among buttercups for an almost total absence of acridity, and resembling, in this respect, the water snow-cups and the goldilocks.

Curtis, i. 113; E. B. xxi. 1504.

14. Turnip-rooted Buttercup—*Ranunc'ulus bulbo'sus.*

Everywhere in meadows and pastures, except in the north of Scotland; the first of the three common field buttercups to open its flowers, and lingering to the very end of the year.

Curtis, i. 38; E. B. viii. 515.

Occasionally found semi-double.

Buttercups are often supposed to give the yellow colour to spring butter. But cattle in general have a strong aversion to them, on account of their acridity; and when eaten, it is probably without intention, or perhaps as a condiment, like salt and pepper by mankind. Dried along with grass, they lose their pungent juices, and become a useful component of the hay.

15. Pale Hairy Crowfoot—*Ranunc'ulus hirsu'tus.*

Moist meadows, and damp, waste ground; rather uncommon. Fl. June—October. Annual.

Curtis, i. 113; E. B. xxi. 1504.

16. Cornfield Crowfoot—*Ranunc'ulus arven'sis.*

Cornfields, especially among wheat; not uncommon, but chiefly in the south. Fl. June. Annual.

Curtis, ii. 400; E. B. ii. 135.

17. Small-flowered Crowfoot—*Ranunc'ulus parviflo'rus.*

Gravelly fields, and dry waste land; chiefly in the southern counties. Fl. May, June. Annual.

E. B. ii. 120.

18. Celery-crowfoot—*Ranunc'ulus scelera'tus.*

Ditches, and by stagnant and dirty water, especially in old brick-crofts; common in England, but not found in Scotland. Fl. June—October. Annual.

Curtis, i. 115; E. B. x. 681.

Recognised immediately by its large and projecting heads of minute ovaries, minute petals, and celery-like foliage.

19. PILE-WORT—*Fica'ria ver'na.*

One of the earliest heralds of spring, abounding everywhere on hedge-banks, and in woods, and thriving especially beneath rookeries.

Curtis, i. 112; E. B. ix. 584 (both as *Ranunc'ulus Fica'ria.*)

A flower easily identified by its narrow and shining petals, which seem as if polished artificially. They close before rain and at night, and curl backwards and turn white when overblown. A double-flowered variety is found in gardens.

Pile-wort rarely produces ripe fruit, multiplying chiefly by its abundant tubers, which occur even in the axils of the leaves. Wood-pigeons eat large quantities of them. Wordsworth celebrates it under the name of "the lesser celandine."

20. MOUSETAIL—*Myosu'rus min'imus.*

Corn and clover fields, old gravel-pits, and by waysides, especially where water has been apt to stagnate; rare, and chiefly in the south and south-east. Fl. May, June. Annual.

Curtis, ii. 243; E. B. vii. 435; Baxter, iii. 204.

21. ALPINE MEADOW-RUE—*Thalic'trum alpi'num.*

Moist moors and pastures in the hilly parts of the north of England and Wales, and more particularly upon the high mountains of Scotland, growing among *débris*, in the fissures of damp rocks, and upon the margins of little rills. Found also in Ireland. Fl. June.

E.B. iv. 262 (not good); Bot. Mag. xlviii. 2237.

22. SMALL MEADOW-RUE—*Thalic'trum mi'nus.*

Chalky and stony fields upon elevated ground; bushy hills, and in sandy maritime pastures. Chiefly in the north of England and in Scotland. Plentiful about Windermere and Llangollen, and very abundant in the Hebrides. Fl. June, July.

E.B. i. 11.

The *Thalic'trum ma'jus* of E.B. ix. 611 is not distinguishable from this by any exact and permanent characters, nor is the *Thalic'trum flexuo'sum* essentially different. *Thalic'trum Koch'ii, saxat'ile,* and *calca'reum* are only trifling varieties.

23. COMMON MEADOW-RUE—*Thalic'trum fla'vum.*

About the banks of rivers and ditches, in wet meadows, and especially in osier-beds; not uncommon in England, but rather scarce in Scotland. Abundant at Thames Ditton. Fl. June, July.

E.B. vi. 367; Baxter, iv. 254.

24. MARSH-MARIGOLD—*Cal'tha palus'tris.*

Illuminates the borders of every pond and marsh, in April and May, with broad masses of golden bloom, every blossom the size of a half-crown. Also in marshy meadows. A flower often re-appears in Sept.

Curtis, i. 40; E. B. viii. 506; Baxter, ii. 153.

Common in gardens, with the flowers double, but much inferior in beauty to their wild and single state, the petals being narrow and small. These double-flowered plants are probably derived from a variety with reclining branches, and altogether smaller, which has been named *Cal'tha rad'icans.* (E. B. xxxi. 2175.)

25. GLOBE-FLOWER—*Trol'lius Europæ'us.*

Moist pastures and shady places in the hilly districts of the north of England, Wales, and the lowlands of Scotland; not rare. Abundant in Craven and near Windermere. Fl. May, June.

E. B. i. 28; Baxter, iv. 241.

Very common in gardens, where, after wet summers, it often blossoms again in October.

26. COLUMBINE—*Aquile'gia vulga'ris.*

Hedgebanks, waysides, and on the borders of fields, chiefly in the mountainous districts; not uncommon. Gresford, in profusion. Graythwaite Woods, Windermere, abundant, pink, white, and blue. The same in Broughton Woods, near Brigg, Lincolnshire. Fl. June, July.

E. B. v. 297; Baxter, iii. 221.

Universally in gardens, in many different colours, and usually double. Sometimes with a whitish calyx and a purple corolla. The double state is acquired in a very curious manner: few or none of the stamens are converted into petals; but the latter multiply in such a way as to be enclosed one within another, to the extent often of half-a-dozen, every one of them retaining the cornucòpia form, and having a nectary at the extremity. The foliage in early spring is very ornamental, being delicately curled, and holding rain-drops that look like globules of quicksilver, whence the name *Aquile'gia.* "Columbine" refers to the resemblance of the petals to a nest of doves.

27. TRAVELLERS'-JOY—*Cle'matis Vital'ba.*

Hedges, woods, and thickets, scrambling over solitary thorns upon hills, forming natural bowers and arbours, mounting into trees, or trailing and pendulous from broken and precipitous rocks; a beautiful and abundant ornament of the limestone districts of the south and west of England. In the north, and in Scotland and Ireland, only as a garden plant, or rarely half-naturalised. Fl. July.

Curtis, ii. 257; E. B. ix. 612; Baxter, ii. 129.

Nothing can be more charming than the appearance of this wayward but always elegant plant, as we see it about St. Vincent's Rocks, and upon the hills at Walton, Somersetshire, where it covers every bush with a canopy of streaming tangle. In autumn, the great panicles of feathered fruit look like handfuls of white floss silk, and are attractive to the most incurious. "Vitalba" signifies "white vine,"—

> Lentior et salicis virgis, et vitibus albis.
> "Tougher than these sallow-twigs and than Clematis."—OVID, Met. xiii. 800.

A horizontal section of the stem forms an extremely beautiful object for the microscope, especially when viewed by polarized light; or upon a blue or crimson ground supplied by the kaloscope.

28. Monkshood—*Aconi'tum Napel'lus.*

Watery places, where somewhat shaded by trees. Found in various parts of the country, but local and rare, and probably only naturalised. Fl. July.

E. B. Supp. ii. 2730; Baxter, ii. 87.

The nectaries of the monkshood are most singularly and elegantly formed, each being elevated upon a long stalk, and resembling a little bird. Several exotic species, called by the same general name, occur in gardens, as well as the *Napel'lus*, and, notwithstanding their noxious qualities, are not infrequently seen growing even by the side of kitchen-vegetables, where they should never be permitted.—These foreign kinds have large and branching panicles; and blossom throughout the autumn. The *Aconi'tum variega'tum* has *white* corollas, only the edges of which are violet.

29. Wild Pæony—*Pæo'nia coralli'na.*

In the rocky clefts of the Steep Holmes, one of that remarkable pair of islands in the Severn which form so conspicuous an object from the watering-places on the coast of Somersetshire and North Devon. Probably introduced. Fl. May, June.

E. B. xxii. 1513; Baxter, iii. 217.

The common garden-pæony or *Pæo'nia officina'lis*, (Bot. Mag. xliii. 1784.) one of the most splendid flowers in nature, whether single or double, the latter sporting through every shade of crimson and pink down to pure white, is by some believed to be derived from the *coralli'na*. The follicles of ripe seeds are remarkable for their size and beauty.

30. Green Hellebore—*Helleb'orus vir'idis.*

Woods and thickets upon limestone and chalky soil, chiefly in the south and west of England; rare. Leigh woods. Gresford. Surrey. Fl. April, May.

Curtis, ii. 398; E. B. iii. 200.

31. Fœtid Hellebore—*Helleb'orus fœt'idus.*

Thickets and waste ground in calcareous soil; rare. Chiefly in the south-eastern counties. Herefordshire. Fl. March, April.

E. B. ix. 613; Baxter, ii. 103.

Common in rustic gardens. Both this and the preceding species, when growing in coppice-woods, are apt to disappear when the trees are grown tall, coming up again when they are cut down, and taking turn to be in the ascendant. Few plants better show the nature and origin of bracts. From the root upwards the leaves gradually decrease in size, their petioles at the same time becoming thinner and shorter; the upper ones have only the rudiment of a lamina; and in the topmost this part is wanting altogether.

32. Winter-aconite—*Eran'this hyema'lis.*

An Austrian plant, common in gardens, and naturalised in woods in various places in the south of England. Fl. March, April.

Bot. Mag. i. 3 (as *Helleb'orus hyema'lis.*)

33. Cornfield Larkspur—*Delphin'ium Consol'ida.*

Cornfields upon chalky and sandy soil; chiefly in the south-eastern counties. Southport, Lancashire. Fl. June, July. Annual.

E. B. xxvi. 1839; Baxter, iv. 297.

Common in gardens; the flowers varying to dull pink and white, and lasting till November. The deep-blue of the petals is remarkably permanent, and in well-dried specimens is retained almost indefinitely.

34. Baneberry—*Actæ'a spica'ta.*

Among bushes upon hills in the limestone districts of Yorkshire, and in Scotland; rare. Fl. May, June.

E. B. xiii. 918; Baxter, iii. 218.

Besides the species named above, there are commonly cultivated in gardens about fifty others of this family. The Christmas-rose, or *Helleb'orus ni'ger*, opens its large white cups at the close of the year, and blooms profusely till the end of January, a beautiful example of the promotion of calyx, and the subordination of corolla; in March come the yellow *Ado'nis vernal'is;* (Bot. Mag. iv. 134.) and the hepaticas, white, blue, and double pink, the latter resembling tiny roses; then come the gorgeous, velvety, many-hued anemones, *(Anemo'ne horten'sis* and *corona'ria,* Bot. Mag. iv. 123, xxii. 841.) remarkable for the deep purple, amounting almost to blackness, of their innumerable stamens and pistils. May brings the turban Ranunculus, or *R. Asiat'icus*, in varieties of all hues, the scarlet one the commonest; also the white *Ranunc'ulus amplexicau'lis*, (Bot. Mag. viii. 266.) and the *Trol'lius Asiat'icus.* (Bot. Mag. vii. 235.) As the days lengthen, the superb Chinese tree-pæony, or *Pæo'nia Mou'tan*, (Bot. Mag. xxix. 1154.) begins to blow, along with different kinds of exotic columbine and larkspur, the latter mostly deep-blue; and several beautiful yellow species of *Ranunc'ulus*, as *Cassu'bicus* and *cortusæfo'lius.* Lastly, come the exotic species of *Aconi'tum* and *Thalic'trum*, and the Virgin's Bower or *Cle'matis Flam'mula*, which, in the sweet perfume it mingles with the breath of autumn, compensates the general scentlessness of the family. Several others of this genus are very common, as the *Cle'matis Flor'ida*, with white and purple flowers, generally double; the large purple *Cle'matis Viticel'la;* the *Cle'matis Vior'na*, the flowers of which resemble pendulous and purple acorns; and the *Cle'matis Japon'ica* or "passion-flower Clematis," so called from its great lilac and starlike blossoms. In October, we have the rosy flowers of the Japanese Anemone.

Of species interesting from their powerful properties, or their anomalous aspect or structure, though not common, except in one or two instances, there are probably a dozen more. The favourite annuals called *Nigel'la*, (Bot. Mag. i. 22.) are remarkable, as named above, for the cohesion of the ovaries, which by the time they are ripe, form a large oblong capsule. The blue or white flowers are surrounded by an involucrum of very finely subdivided bracts, whence the English generic name of "Lady-in-the-bower." *Xanthorhi'za apiifo'lia* (Bot. Mag. xlii. 1736.) is a rare and elegant little shrub from Carolina and Georgia, with remarkably yellow roots; 3—5-lobed leaves, much cut and serrated; and panicled racemes of small purplish and pentandrous flowers, produced, with the leaves, early in spring, at the extremities of the branches. *Knowlto'nia vesicato'ria* (Bot. Mag. xx. 775.) has leaves like those of a strawberry, and small umbels of regular yellowish-green flowers. *Cimicif'uga* is a genus resembling *Actæ'a*, with the flowers in panicles or spikes, as in *C. palma'ta* and *cordifo'lia*. (Bot. Mag. xxxix. 1630, xlvi. 2069.) The famous Rattle-snake root, or *Cimicif'uga Serpenta'ria*, of North America, is now called *Botro'phis actæoi'des*. *Podophyl'lum pelta'tum*, the American "May-apple" or "Duck's-foot," (Bot. Mag. xliii. 1819.) is a singular plant, with an erect stem, bearing two broad peltate and deeply-incised leaves, and a solitary and sessile white flower, formed of three sepals and nine petals. *Hydras'tis Canaden'sis*, *Cop'tis trifolia'ta*, and several others of interest in pharmacy, are grown in Botanic Gardens and by the curious.

The Christmas-rose is probably the famous "moly" of the ancients,—

> That Hermes once to wise Ulysses gave.

So at least we may infer from Ovid,—

> Pacifer huic dederat florem Cyllenius album,
> Moly vocant superi; nigra radice tenetur.

[The peaceful Cyllenian god had given him a white flower, which the heavenly inhabitants call moly, and which is bound to the earth by a black root.]—Met. xiv. 271—292.

V. THE SARRACENIA FAMILY.—*Sarracenia'ceæ.*

The limits of this family, as in several other cases, scarcely exceed those of the typical genus, the species of which are popularly called "Side-saddle flowers" and "Indian-cups." They are very singular American plants, growing chiefly in the bogs and woods of the north, and extending as far as New Brunswick. The latter of the two names has reference to the peculiar and characteristic form of the leaves, which are wholly radical, and consist principally of a hollow petiole, more or less erect, and varying, in different species, from 3—15 inches in length, and from half an inch to two inches in diameter. The lamina is about an inch broad, ear-like, rounded and pointed, nearly erect, and usually with the margins recurved. Not being articulated with the petiole, like that of *Nepen'thes*, its position is never altered. The other name refers to the flowers. These are large and handsome, yellow or reddish, generally solitary, and half-pendulous from the summit of radical scapes a foot in height. Their great peculiarity is in the stigma-plate, which in the true Sarracenias is enormous and 5-lobed, and spreads over the centre of the flower like an umbrella, the five large and flaccid petals hanging down between the lobes in such a manner as to suggest the idea of a side-saddle with its occupant. Several species occur frequently in conservatories, as *Sarrace'nia fla'va*, *purpu'rea*, and *ru'bra*, (Bot. Mag. xx. 780, xxii. 849, lxiii. 3515.) all of which, in favourable localities, will grow well upon wet rock-work out of doors. In *Heliampho'ra* the stigma is reduced to a point.

VI. THE FRANKENIA FAMILY.—*Frankenia'ceæ.*

Four or five very small genera constitute this family, so far as known. It is represented, nevertheless, on the sea-coasts of almost all warm and temperate countries, one of the species appearing in Britain. This is a low-growing, prostrate under-shrub, with numerous wiry branches 6—8 inches in length; abundance of narrow and glabrous leaves, crowded into little opposite clusters; and small rose-coloured flowers, sessile among the upper leaves. Sepals 4—5, combined. Petals about five. Stamens 5—8. Ovary solitary.

HABITATS AND DISTRIBUTION.

COMMON FRANKENIA—*Franke'nia læ'vis.*

Salt marshes about Yarmouth, abundant; and elsewhere upon the eastern and south-eastern coasts of England. Fl. July.

E. B. iii. 205; Baxter, ii. 132.

The annual *Franke'nia pulverulen'ta,* (E. B. xxxi. 2222.) is not now esteemed British.

VII. THE ST. JOHN'S-WORT FAMILY.—*Hyperica'ceæ.*

A family of 300 species, widely dispersed over the world, neat and often showy in their flowers, but otherwise unimportant. The only representatives met with in ordinary botany are the true St. John's-worts, all of which are herbaceous or under-shrubby, and have regular and yellow flowers. Leaves simple and undivided, in outline mostly oval or oblong, and usually opposite. Sepals five, two of them outside the other three. Petals five, their sides often unequal, and sometimes a little gashed; the margins, as well as those of the sepals, frequently dotted with black. Stamens usually numerous, sometimes one or two hundred or more, with long and slender filaments that are united at the base into three or five clusters. Ovary solitary, large, egg-shaped, and usually yellow. Styles usually 3—5, sometimes consolidated, as in the *Hyper'icum monogy'num.* Fruit a capsule containing abundance of minute seeds; usually dry, sometimes berry-like. The leaves frequently appear full of minute holes when held between the eye and the light.

Eleven species grow wild in Britain. The *Hyper'icum barba'tum* of E. B. xxviii. 1986, is no longer accounted indigenous.

A.

Sepals broad, round, and unequal. Stems shrubby. Leaves egg-shaped and sessile. Flowers terminal.

a. Styles five. Flowers 2—3 inches across. Stamens in five parcels of 100 each. Stems 1—2 feet high. 2. ROSE-OF-SHARON.

b. Styles three. Flowers an inch across. Stems 2—4 feet high. 3. TUTSAN.

B.

Sepals small and narrow.

a. Whole plant very woolly. Stems procumbent, 6—12 inches long, the branches erect. Leaves circular. Flowers few and pale, usually closed. Stamens few.
4. Woolly St. John's-wort.

b. Stems downy or hairy, erect, 1—2 feet high. Leaves elliptical and dotted.
5. Hairy St. John's-wort.

c. Whole plant perfectly glabrous.

1. Stems trailing, weak, 3—10 inches long. Leaves elliptical or oblong.—Petals not longer than the sepals. Stamens about 15.
6. Trailing St. John's-wort.

2. Stems ascending, procumbent at the base, 6—9 inches high. *Leaves linear*, rarely dotted. Petals twice or thrice as long as the black-dotted sepals. Stamens about 30. 7. Linaria-leaved St. John's-wort.

3. Stems all erect, stiff, 1—2 feet high. Stamens numerous.

Sepals fringed at the upper part with black dots.

Stem branched. Leaves broadly heart-shaped, with abundance of pellucid dots. 1. Pretty St. John's-wort.

Stem usually unbranched. Leaves ovate, without pellucid dots.
10. Mountain St. John's-wort.

Sepals not so fringed. Stamens triadelphous.

Stem two-edged. Leaves elliptical, obtuse. A black dot on every anther. 9. Common St. John's-wort.

Stem more or less four-angled. Leaves ovate. Anthers without black dots.

Sepals erect and acute. Leaves with numerous pellucid dots. Stem acutely four-cornered.
8. Square-stalked St. John's-wort.

Sepals reflexed, obtuse or nearly so. Leaves with very few dots, or none at all. Stem bluntly four-cornered.
11. Imperforate St. John's-wort.

HABITATS AND DISTRIBUTION.

1. Pretty St. John's-wort—*Hyper'icum pul'chrum.*

Waysides, and dry sandy hedgebanks that look sunwards; common. Fl. July, August.

Curtis, i. 56; E. B. xviii. 1227.

One of the most elegant of our wild-flowers, recognised immediately, among the St. John's-worts, by its slender cylindrical stems, distant pairs of heart-shaped, sessile, and nearly horizontal leaves, scarlet pollen, almost orange-coloured petals, and red-tipped flower-buds.

2. Rose-of-Sharon—*Hyper'icum calyci'num.*

Woods and bushy places; principally in the west of Ireland and in Scotland. Fl. July—September.

E. B. xxix. 2017; Bot. Mag. v. 146.

Common in gardens.

3. TUTSAN—*Hyper'icum Androsæ'mum.*

Moist thickets and woods; on banks in glens, where water trickles, often at fox-and-grapes height; occasionally on the sea-shore, just above high-water-mark. Frequent in the south and west; rare in the east. Fl. July—September.

Curtis, i. 193; E. B. xviii. 1225; Baxter, i. 39 (as *Androsæ'mum officina'le.*)

A very common ornament of gardens and the edges of plantations. The leaves decrease in size towards the ends of the branches, which terminate in still shorter clusters of about four flowers each. The capsules, when ripe, are berry-like, black and glossy. When dried, this plant has the odour of liquorice. When the styles are longer than the stamens, it is the *Hyper'icum Ang'licum* of some authors. This is the form represented in E. B.

4. WOOLLY ST. JOHN'S-WORT—*Hyper'icum Elo'des.*

Spongy bogs; principally in the mountainous districts and in the west. Abundant on moors near Macclesfield. In Scotland rare. Fl. July, August.

E. B. ii. 109.

5. HAIRY ST. JOHN'S-WORT—*Hyper'icum hirsu'tum.*

Thickets and hedges, preferring limestone, and often near water; common. Fl. June, July.

Curtis, i. 194; E. B. xvii. 1156.

6. TRAILING ST. JOHN'S-WORT—*Hyper'icum humifu'sum.*

Dry, sandy, and gravelly banks, generally under the protection of larger and stouter plants; common except in Scotland. Fl. July—Sept.

Curtis, i. 195; E. B. xviii. 1226.

7. LINARIA-LEAVED ST. JOHN'S-WORT—*Hyper'icum linariæfo'lium.*

Dry waste ground in Devonshire, Cornwall, and the Channel Islands; local and rare. Fl. July.

E. B. Supp. iii. 2851.

8. SQUARE-STALKED ST. JOHN'S-WORT—*Hyper'icum quadrang'ulum.*

Moist and marshy places, and on the banks of rivers; common, except in Scotland. Fl. July, August.

Curtis, ii. 272; E. B. vi. 370.

9. COMMON ST. JOHN'S-WORT—*Hyper'icum perfora'tum.*

Copses, dry hedgebanks, and rough places, where the earth is seldom disturbed; abundant everywhere. Fl. July—September.

Curtis, i. 57; E. B. v. 295; Baxter, i. 80.

The petals often seem to have had a small piece cut out of the side, and then present a very odd appearance, declaring the plant at a long distance.

10. **Mountain St. John's-wort**—*Hyper'icum monta'num.*

Wild and bushy hills, where the soil is gravelly or chalky; rather rare, and seemingly confined to England. Fl. July.

E. B. vi. 371.

The flowers form a close, compact cyme, which is often reduced to a head, and excellently marks the species.

11. **Imperforate St. John's-wort**—*Hyper'icum du'bium.*

Dry hedgebanks and copses; generally diffused, but rather rare.—Fl. July, August.

E. B. v. 296.

"*Hyper'icum macula'tum*" is a variety of this, distinguished by purple streaks and dots upon the under surface of the petals.

In gardens, besides those above-named, are found the *Hyper'icum Coris,* (Bot. Mag. vi. 178.) *Balear'icum,* (iv. 137.) *Ura'lum,* (l. 2375.) *Sinen'se, el'egans,* and two or three others.

VIII. THE POPPY FAMILY.—*Papavera'ceæ.*

Herbaceous or rarely under-shrubby plants, often of nauseous odour, and with the juice of the stem or root frequently orange-coloured, red, or milky-white. Leaves usually alternate, occasionally all radical, simple, often much divided, but sometimes not at all so. Flowers regular; sepals two or three, often convex, falling or pushed off vertically when the petals expand; the latter usually four, occasionally six or eight, white, red, purple, or yellow (blue in the *Meconop'sis Wallich'ii* from the Himalayahs), often with a dark spot at the base, generally large and conspicuous, and in æstivation crumpled; stamens 30 to 2—300.

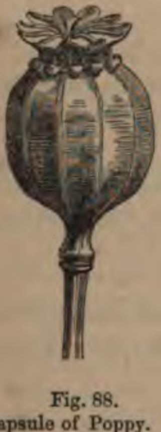

Fig. 88.
Capsule of Poppy.

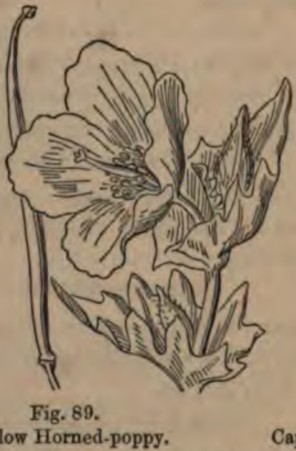

Fig. 89.
Yellow Horned-poppy.

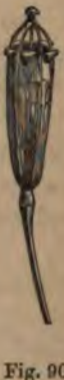

Fig. 90.
Capsule of *Meconop'sis.*

The ovary varies. In the Californian genus *Platyste'mon*, which connects this family with the *Ranuncula'ceæ*, it is formed of several linear carpels, each with its own stigma, and though combined while young, falling apart when ripe. But all of the true poppy-type have a solitary and one-celled ovary, which is either long and slender, and ripens into a linear pod; or else is ovoid or globular, and provided with numerous vertical plates, that project from the outer wall towards the centre, and bear the seeds upon their surfaces. In this latter case the sessile stigmas radiate upon the summit, like those of water-lilies, forming a rude star of velvety ridges, the number of which corresponds with that of the *quasi*-cells, and the fruit is capsular, and more or less urn-shaped. When ripe, the seeds escape by peculiar openings under the cornice. (Fig. 88.) The flowers are prone to become double under cultivation. Those of the true poppies are pendulous while in the bud state; and when expanded, often remarkably ephemeral. Two or three genera, as *Bocco'nia*, have no petals, and, through the genus *Thalic'trum*, establish a further relationship with the *Ranuncula'ceæ*.

Everyone knows the character of the Lethean poppy, the source of opium, laudanum, and morphia,—

> quarum de lacte soporem
> Nox legit, et spargit per opacas humida terras.

The same is the character of the family in general, *i.e.*, narcotic and dangerous, the oil of the seeds of the opium poppy being the only example to the contrary. Some species, as the celandine, are acrid and violently poisonous. Of 180 that are known, two-thirds belong to Europe, and the remainder are scattered over the globe.

Ten species grow wild or have become naturalised in Britain, all with tetramerous flowers. *Glau'cium cornicula'tum* or *phœni'ceum* (Curtis, ii. 396; E. B. xx. 1433.) is sometimes added to the list, but if ever found wild, is now lost.

A.

FLOWERS INVARIABLY YELLOW.

Flowers solitary, erect upon the summit of leafless and radical scapes about six inches high. Leaves pinnatifid and cut. Whole plant covered with tawny down. 6. YELLOW ARCTIC POPPY.

Stem branched, the peduncles axillary and terminal.

1. *Flowers not exceeding an inch across.* Leaves tender and thin, 3—6 inches long, and 3—4 inches broad, pinnatifid, with about five broadly-ovate lobes. Flowers 3—6 together, in loose, long-stalked umbels. Stamens about 30. Seed-pods 1½—3 inches long, opening lengthways from the base. Plant bushy, 1—2 feet high. 1. CELANDINE.

(FLOWERS INVARIABLY YELLOW. Stem branched, the peduncles axillary and terminal.)

2. *Flowers considerably more than an inch across.*

Sea-shore plant, 1—2 feet high, stout and glaucous in every part. Leaves thick, leathery, and scabrous; the upper ones sinuate and stem-clasping; the lower ones lyrate, jagged, and curled. Flowers brilliant and very showy. Seed-pods 6—12 inches long. (Fig. 89.)
2. YELLOW HORNED-POPPY.

Plant pale-green, 12—18 inches high, delicate and somewhat succulent. Leaves thin and tender, pinnatifid, the segments divided and jagged. Flowers upon long peduncles, half-pendulous, lemon-coloured, and fragrant. Capsules an inch long, glabrous, opening at the summit into 4—5 little arches. (Fig. 90.) 4. YELLOW POPPY-FACE.

B.

FLOWERS RED, CRIMSON, VIOLET, PURPLE, OR WHITE, often with a dark spot at the base of every petal. STEMS LEAFY AND MANY-FLOWERED.

A. Plant glabrous.

1. Leaves sinuated, unequally-toothed, and stem-clasping. Plant glaucous. Ovary globular, becoming a glabrous capsule with many partitions.—Flowers white, purple, or red. 5. OPIUM POPPY.

2. Leaves deeply-pinnatifid. Ovary linear, becoming a pod 2—3 inches long. Flowers violet-blue. 3. VIOLET HORNED-POPPY.

B. Plant more or less rough and bristly with short hairs. Flowers red. Leaves pinnatifid and cut.

1. Petals narrow, longer than broad. Capsules more or less bristly.

Capsule oblong or obovoid, with a few erect bristles upon the upper part. Flowers dull scarlet, tinged with orange, and extremely fugitive. 7. PALE-RED POPPY.

Capsule nearly globular, with spreading bristles all over the surface. Calyx very hairy. Flowers deep crimson. Pollen bright blue. 8. ROUGH-HEADED POPPY.

2. Petals nearly circular, their edges lapping over a little. Capsules without bristles. Flowers very handsome.

Bristles of the flower-stalk appressed, giving the latter a silky appearance. Petals pale scarlet. Stigma 6—8 rayed.—Capsule oblong. 9. LONG-HEADED POPPY.

Bristles of the flower-stalk usually spreading. Petals vivid crimson, and undulated. Stigma 10—12 rayed. Capsule globular or top-shaped. 10. CRIMSON CORN-POPPY.

HABITATS AND DISTRIBUTION.

1. CELANDINE—*Chelido'nium ma'jus.*

Hedges and waste places, generally near houses, and looking like a garden outcast; common. Fl. May—August.

E. B. xxii. 1581; Baxter, i. 51.

The juice of this plant is a violent and acrid poison. It exudes freely, and of a deep orange colour, on snapping the branches, especially at the joints and near the root. A double-flowered variety occurs both wild and in gardens. Another, with the lobes of the leaves deeply cut, has been named *C. lacinia'tum*.

2. YELLOW HORNED-POPPY—*Glau'cium lu'teum.*

Sandy and rocky shores; common, but not, like most of our sea-loving plants, universal. Very abundant in North Wales, and upon some of the eastern coasts, which it ornaments brilliantly, growing within reach of the salt rain thrown from the surf. In Scotland, not beyond the Clyde and Forth. Fl. July, August. Annual.

Curtis, iii. 499; E. B. i. 8 (as *Chelido'nium Glau'cium);* Baxter, ii. 131.

3. VIOLET HORNED-POPPY—*Röme'ria viola'cea.*

Cornfields in Norfolk and Cambridgeshire; very local, and probably introduced. Fl. July, August. Annual.

E. B. iii. 201 (as *Chelido'nium hyb'ridum.*)

4. YELLOW POPPY-FACE—*Meconop'sis Cam'brica.*

Mountainous woods and uncultivated places, chiefly in Wales and the north of England, growing where shaded by trees, and in the neighbourhood of waterfalls. Fl. May—October.

E. B. i. 66 (as *Papa'ver Cam'bricum*); Baxter, i. 54.

A very delicate and pretty rockery-plant, and often cultivated as such.

5. OPIUM POPPY—*Papa'ver somnif'erum.*

Cornfields and waste ground; not uncommon, but always as a descendant of cultivation, more or less remote. Abundant in Kent. Fl. June—September. Annual.

E. B. xxx. 2145; Baxter, i. 53.

This is the species which, under cultivation, yields the "poppy-heads" of the druggists' shops. The normal colour of the flower appears to be white, with a blueish cast, and usually a dark spot at the base of every petal; but it varies to every shade of red and purple, both in the fields and in gardens. Of the latter it is a very common inhabitant, both single and double. The entire plant is glabrous, with the exception of a few hairs occasionally upon the peduncles.

6. YELLOW ARCTIC POPPY—*Papa'ver nudicau'le.*

Among rocks in the hills at Achill-head, in the north-west of Ireland; a plant essentially of the Arctic regions. Fl. summer.

Curtis, iv. 618; E. B. Supp. i. 2681; Bot. Mag. xxxix. 1633.

Occasionally in gardens, and then often 18 inches high.

7. PALE-RED POPPY—*Papa'ver Argemo'ne.*

Cornfields; but rather uncommon. Fl. June—September. Annual.

Curtis, ii. 330; E. B. iv. 643.

8. Rough-headed Poppy—*Papa'ver hyb'ridum.*

Dry and sandy fields. Rare, chiefly in the south, and in Scotland not found. Fl. July. Annual.

E. B. i. 43.

9. Long-headed Poppy—*Papa'ver du'bium.*

Cornfields; rather uncommon, and chiefly abundant northwards, extending even to the Shetland Islands. Fl. June, July. Annual.

Curtis, ii. 329; E. B. ix. 644.

10. Crimson Corn-poppy—*Papa'ver Rhœ'as.*

Cornfields, as a brilliant weed. Frequent also in waste ground.—Abundant in the south, diminishing northwards, and in some districts, as near Manchester, very rare. Fl. June—October. Annual.

Curtis, i. 177; E. B. ix. 645.

Distinguished at a glance by the rich and satiny gloss of its large and circular petals, which are not "scarlet," but *crimson*. The capsule is half-globular, and the shape of a boy's whip-top. A variety called β *strigo'sum* has the hairs of the peduncles appressed. The more abundant stigmatic rays then distinguish it from the *P. du'bium*. Double varieties, called "French Poppies," are favourite garden-flowers.

Poppies are remarkable alike for their fecundity, and for the suddenness with which they appear and vanish when left to themselves. The seeds vegetate with freedom only where the soil has been recently turned over; and if a field or garden in which they have been scattered is laid down to grass, or is in any way hardened and compacted, they seem to lose the power of growth, the plant disappearing almost entirely. Possessed, however, of uncommon tenacity of life, directly the ground is disturbed anew, no matter how distant the interval, the latent energy comes forth, and poppies are again abundant. The surfaces of railway cuttings have in many instances been ornamented, the first season, with the crimson of the *Papa'ver Rhœ'as*, the seeds of which must have been lying in the earth for ages.

The garden species of Papaveraceæ, though numerous, are, with the exception of the gaudy true poppies and one or two others, little cared for. The commonest of the former, after the florists' varieties of the opium-poppy and the crimson corn-poppy, are the *Papa'ver bractea'tum* and the *Papa'ver Orienta'le*, both with large and flaunting flowers of the intensest scarlet. The well-known annual, with dazzling crocus-coloured flowers, decumbent and glaucous stems, and finely-divided leaves, commonly called *Eschscholtz'ia*, but more euphoniously *Chry'seis*, is from California. The calyx, in this plant, is pushed off by the expanding petals in the shape of a candle-extinguisher. Other ornamental annuals are found in the hexapetalous genera *Argemo'ne*, *Platyste'mon*, and *Platystig'ma*. (Bot. Mag. vii. 243, lxiv. 3576, lxiv. 3579.) *Dendrome'con* is a little shrub with the aspect of a Cistus. One of the most curious of the family is the *Sanguina'ria* or blood-root, so called from the resemblance of the cut rhizome to excoriated flesh. The blossoms resemble those of the wood-anemone, and appear in March.

Bocco'nia frutes'cens, from the West Indies, an under-shrubby plant, growing 5—6 feet high, is esteemed for its foliage, the leaves resembling those of the *Quer'cus Cer'ris* in figure, but 18 inches long, including the petiole, and more regularly cleft, and glaucous. *Bocco'nia* or *Macleay'a corda'ta* from China, (Bot. Mag. xliv. 1905.) is valued for its handsome panicles of flowers, which are not very unlike those of Thalictrums.

IX. THE MAGNOLIA FAMILY.—*Magnolia'ceæ.*

Noble and well-marked trees from the East Indies and the warmer parts of North America. Leaves usually very large, alternate, simple, perfectly glabrous, and with their stipules curled inwards and covering the buds. Flowers trimerous, usually several inches across, solitary, terminal, strikingly beautiful, and generally fragrant. Stamens 50—100. Ovaries equally numerous, and piled up in a cone-like manner. Several species occur in every well-planted pleasure-ground, especially the common "tulip-tree" or *Lirioden'dron*, immediately known by its singular leaves, which are the size of the palm of the hand, four-lobed, square at the top, and with the lower edges in a double wave like the limbs of a printer's bracket. The flowers are orange-coloured, with a mixture of red and green. Magnolias have elliptical leaves, and white, greenish-yellow, or purple corollas. *Magno'lia grandiflo'ra* is evergreen; the others, including *glau'ca*, *tripet'ala*, and *purpu'rea*, are deciduous, or nearly so. One of the most desirable is the *Magno'lia conspic'ua*. In conservatories are sometimes found species of *Talau'ma* and *Miche'lia*, and some shrubs, quite unlike magnolias, but nevertheless related to them, and distinguished as the sub-family *Wintera'ceæ*. The most interesting is the anomalous *Tasman'nia aromat'ica*, which has elliptical, exstipulate, and dotted leaves, and sessile clusters of inconspicuous and whitish-brown flowers. Another of this group, the *Illi'cium anisa'tum*, furnishes the "star-anise" of the shops. *Illi'cium Florida'num* (Bot. Mag. xiii. 439.) has powerfully fragrant leaves.

X. THE TOUCH-ME-NOT FAMILY.—*Balsamina'ceæ.*

Herbaceous plants, growing 1—3 feet high, the stems swollen at the joints, and often succulent with watery juice. Leaves simple, oblong, ovate or lanceolate, undivided, toothed, petiolate, and usually flaccid. Flowers extremely irregular; in structure and affinities pentamerous, but of only six distinguishable pieces. Stamens five, the filaments thick and short, and the anthers cohering into an oblong mass which resembles a molar tooth with five roots, and completely conceals the five minute and sessile stigmas. Which of the six pieces of the perianth are calyx, and which are to be considered petals, and how much of the flower is wanting or imperfect, is unsettled. It would appear that only one of the ten theoretical pieces is really deficient, the calyx being composed of the spur, the pair of lateral bract-like pieces, and the large posterior piece, the latter consisting of two sepals united by their edges; while the two inner pieces are in reality four petals, united like the sepals, by their edges, and constituting a genuine, though abnormal, corolla. The fruit is generally a capsule formed of five elastic valves. As soon as ripe, especially if touched, the valves suddenly separate from one another, rolling spirally inwards, and often, by the rapidity of the movement, breaking away and leaping to a long distance from the plant. The large brown seeds are simultaneously jerked out.

India and the adjacent archipelago are the chief abodes of the Touch-me-nots, a few belonging to the temperate parts of Europe and North America. They are conspicuous for their eccentric beauty, but of little discovered use, though the name "Balsam" might lead to the supposition that they are generous and aromatic. The balsam-yielding plants are trees, and constitute an entirely different family.

Three species are accounted British, but two of them are certainly exotic.

1. Stem and leaves as described above; peduncles axillary, slender, hidden beneath the leaves, and bearing about four large and showy yellow flowers, which expand one at a time, and last a very little while, the inside spotted with orange, the spur curved upwards, and then bent back. Serratures of the leaves not glandular. YELLOW TOUCH-ME-NOT.
2. Resembling the former, but with flowers of a deep orange colour, spotted with brown. Serratures of the leaves glandular. TAWNY TOUCH-ME-NOT.
3. Flowers minute and yellowish; the spur straight and elongated. SMALL-FLOWERED TOUCH-ME-NOT.

HABITATS AND DISTRIBUTION.

1. YELLOW TOUCH-ME-NOT—*Impa'tiens Noli-me-tan'gere.*

On rocky banks in glens, where shaded by trees, and water trickles about the roots; rare. Fl. summer and autumn. Annual.

E. B. xiv. 937; Baxter, ii. 125.

2. TAWNY TOUCH-ME-NOT—*Impa'tiens ful'va.*

Woods and damp rough places; a colonist from North America, in course of naturalisation. Fl. summer and autumn. Annual.

E. B. Supp. ii. 2794.

3. Small-flowered Touch-me-not—*Impa'tiens parviflo'ra.* Woods and damp rough places; a colonist like the preceding, found in many parts of England. Lancashire. Yorkshire. Cheshire. Surrey. Isle of Wight. Fl. summer. Annual.

The *Impa'tiens glandulig'era*, a tall and weedy plant with flowers of a dull red colour, is common in gardens, and fast disseminating itself over the country. A few Indian species are cultivated in hothouses, but in general only the *Balsam'ina horten'sis*, the "Balsam" of the florist, an exceedingly handsome plant, with thick, semi-translucent stems, and profusion of variegated and usually double flowers, resembling small carnations. One of the most striking is the *Impa'tiens Jerda'ni*, with orchid-like flowers of gamboge and vermilion. In the *Tyto'nia* or *Hydroce'ra na'tans*, a beautiful aquatic from the East Indies, the portion of the perianth absent from the *Impa'tiens* is usually developed.

XI. THE GERANIUM FAMILY.—*Gerania'ceæ.*

Herbaceous or under-shrubby plants. Leaves simple, stipuled, usually fan-lobed, with the segments more or less deeply cleft; but in some cases pinnatifid, and in others oval and undivided; the petioles usually several inches in length. Flowers simple, pentamerous, regular in the British species, often irregular in the exotics; the petals most frequently of some glowing shade of red, richly streaked, laced with coloured veins, or parti-coloured; sometimes white or blue, and similarly pencilled, and always very fugitive. Stamens usually ten; the alternate ones, or three or four, occasionally without anthers; the outer ones shorter; and the whole usually united at the base. Stigmas five, large, coloured, and elegantly recurved. Inflorescence in lateral umbels, which are occasionally reduced to a couple of flowers, or even to a single one. Calyx persistent, and the sepals ribbed. In the herbaceous species the upper leaves are often sessile; and in a few cases the foliage is aromatic or otherwise strongly scented. In *Monso'nia* there are *fifteen* stamens, distributed into one-third as many fasciculi.

The Geraniaceæ are distinguished from all other plants by their fruit, which consists of five one-seeded carpels, greatly lengthened at the upper extremity, and leaning against a tall and slender pillar.—When ripe, the carpels detach themselves from the pillar, commencing at the base, and gradually curving upwards and outwards till they just hang to the apex by their points, forming five light concave arms, each with a seed in the little cup at the extremity. In some genera they twist spirally while separating, and the fine white hairs with which they are often fringed, as in the common scarlet geranium, are converted into a circlet of silver rays. If wetted, the spires uncurl, and become as straight as before they quitted the plant, resuming the ringlet form as they become dry again. This property they retain for many years,—an entertaining and pretty phenomenon for parlour amusement. The hairs probably act as little levers, helping to disengage the carpel from the pillar, and force it into the curve. The Geraniaceæ are further characterised by the numerous joints of their stems, the readiness with which they snap at the joints, and the abundance of their bracts and stipules, which often remain after the leaves are gone.

The plants of this beautiful family fall into three divisions. The first comprises the frequently aromatic shrubs popularly called "geraniums," with irregular flowers, usually only seven perfect stamens, and spirally-twisted carpels, the lovely gifts of the Cape of Good Hope, where they grow in profusion; secondly there are the *Monso'nias*, also from the Cape, with regular and showy flowers and 15 stamens; and thirdly, there are the "Crane's-bills" and the "Heron's-bills," principally inhabitants of the temperate parts of the northern hemisphere, and distinguished by their herbaceous habit of growth, their regular, and often inconspicuous blossoms with 5 or 10 stamens, and the smell of the leaves, if any, being unpleasant, unless in the *Ero'dium moscha'tum.* The two latter genera alone have indigenous representatives in our island, fifteen species occurring in all. *Gera'nium nodo'sum* (E. B. xvi. 1091.) is not now accounted British.

In comparing specimens with the descriptions given in the chart, care should be taken to look at the lower or root-leaves, as the stem-leaves vary considerably, even upon the same individual.

A.

LEAVES PINNATIFID OR FEATHER-LOBED. FIVE STAMENS WITHOUT ANTHERS. STEMS PROSTRATE. CARPELS SPIRALLY TWISTED WHEN RIPE.

Leaves pinnatifid, with distinct segments. Peduncles many-flowered.

Segments deeply pinnatifid, with toothed lobes. Flowers deep rose-colour, occasionally white. 1. COMMON HERON'S-BILL.

Segments egg-shaped, and coarsely-toothed; flowers bright purple; plant with a musky smell. 2. MUSKY HERON'S-BILL.

Leaves toothed or lobed, but not divided into distinct segments. Peduncles one or many-flowered. Petals minute, reddish-purple, usually absent. 3. SEA-SIDE HERON'S-BILL.

B.

LEAVES PALMATELY LOBED AND CUT. CARPELS SIMPLY CURVED WHEN RIPE.

A. *Peduncles one-flowered*, Leaves nearly circular, with 5—7 deep lobes, each of which is 3-cleft. Flowers an inch across, flat, very handsome, purplish-crimson, with sprays of darker veins. 4. CRIMSON CRANE'S-BILL.

(Leaves palmately lobed and cut. Carpels simply curved when ripe.)

B. *Peduncles two-flowered, rarely with three flowers.*

* Petals deeply notched.

Petals twice as long as the calyx, pale-purple. Stems erect, 2—3 feet high. Perennial. 5. Mountain Crane's-bill.

Petals scarcely longer than the calyx, narrow and rosy-purple. Stems procumbent. Whole plant very soft and downy. Carpels wrinkled, but not hairy. Annual. 10. Dove's-foot Crane's-bill.

** Petals without a notch, or only a very slight one.

a. Perennials. Flowers large, usually an inch or nearly an inch across; stems erect, 1—3 feet high.

Flowers bright blue, with white and purple veins, very handsome. Stems 2—3 feet high, downy, with reddish joints. Leaves much cut. Pedicels of the fruit spreading. 8. Blue Meadow Crane's-bill.

Flowers dark brownish-purple, almost black; petals nearly circular, not much longer than the sepals, flat and slightly reflexed. Stems 18 inches high. Leaves with broad lobes. 11. Dusky Crane's-bill.

Flowers blueish-purple, in a large corymbose panicle. Petals about twice as long as the sepals, which end in fine points. Pedicels of the fruit erect. 7. Sylvan Crane's-bill.

b. Annuals. Flowers crimson, rose, or blueish rose-colour (rarely white), not more than half-an-inch across, and usually much less. Petals narrow. Plant seldom more than a foot in height.

Leaves with three deeply-cut lobes; petals entire, streaked with white. Whole plant with a strong odour, and frequently of a bright red colour. 9. Herb-Robert.

Leaves roundish, with five or more deeply-cut lobes. Plant scentless.

Peduncles much longer than the leaves; sepals with long points. 13. Slender Crane's-bill.

Peduncles shorter than the leaves, or about as long.

Leaves always divided to the base; sepals with long points; flowers sitting among the leaves; seeds dotted. 12. Bashful Rose Crane's-bill.

Leaves usually divided only to the middle; circular or reniform.

Calyx pyramidal, with five projecting angles. Whole plant glabrous and shining, and often red, like Herb-Robert. 15. Shining Crane's-bill.

Calyx scarcely angular; plant hairy.

Petals entire; ten perfect stamens; seeds dotted. 14. Round-leaved Crane's-bill.

Petals slightly notched; five stamens without anthers; carpels hairy. 6. Least Crane's-bill.

HABITATS AND DISTRIBUTION.

1. COMMON HERON'S-BILL—*Ero'dium cicuta'rium.*

Borders of fields and dry waysides; common, especially near the sea, and upon limestone. Fl. all summer. Annual and biennial.

Curtis, i. 51 (as *Gera'nium cicuta'rium*); E. B. xxv. 1768.

A truly elegant little plant, the branches varying from two inches to a foot or more in length, and abundantly clothed with deep-green feathery leaves. The flowers, like those of the Pelargoniums, soon fall to pieces.

2. MUSKY HERON'S-BILL—*Ero'dium moscha'tum.*

Dry hills and waste places, chiefly near the sea. Anglesea. Lake district, &c. Abundant in the Channel Islands. Fl. June, July.—Annual.

E. B. xiii. 902; Baxter, v. 362.

3. SEA-SIDE HERON'S-BILL—*Ero'dium marit'imum.*

Sandy and gravelly sea-shores, chiefly in the south; rare. Occasionally inland, as upon Dartmoor, where it is plentiful, and in Worcestershire and Shropshire. Fl. May—October.

E. B. ix. 646.

4. CRIMSON CRANE'S-BILL—*Gera'nium sanguin'eum.*

Cliffs and rocky places, chiefly in the mountainous districts, and where the soil is calcareous or magnesian. Especially fond of the grassy summits of maritime cliffs. Widely distributed, yet not common.—Ormeshead, abundant. Fl. summer.

Curtis, iv. 633; E. B. iv. 272.

The *Gera'nium Lancastrien'se* or "Lancashire Crane's-bill," is a variety of the *sanguin'eum*, with the petals flesh-coloured and laced with red, and taking its name from the Isle of Walney, near Morecambe Bay, which was once esteemed its native place. Both forms of the plant are garden favourites.

5. MOUNTAIN CRANE'S-BILL—*Gera'nium Pyrena'icum.*

Not, as its name would imply, upon mountains, but by waysides and on the borders of fields. Naturalised in many parts of Great Britain and Ireland, but rare. Fl. summer.

E. B. iv. 405.

6. LEAST CRANE'S-BILL—*Gera'nium pusil'lum.*

Dry and gravelly fields and waste places; rather rare. Fl. June—September. Annual.

Curtis, ii. 410 (as *Gera'nium parviflo'rum*); E. B. vi. 385.

7. SYLVAN CRANE'S-BILL—*Gera'nium sylvat'icum.*

Woods and thickets, and occasionally in pastures and upon hedgebanks and the banks of streams, where shaded by trees; abundant in the north of England. Craven, very plentiful. Fl. June, July.

E. B. ii. 121.

8. BLUE MEADOW CRANE'S-BILL—*Gera'nium praten'se.*

Meadows and thickets, chiefly where the soil is somewhat moist, and near rivers; common. Not found in Ireland. Fl. June—August.

Curtis, ii. 269; E. B. vi. 404 (too red); Baxter, i. 30.

The largest, and, next to the *sanguin'eum*, the most showy of our English Crane's-bills, and as a wild-flower unsurpassed. A variety with white flowers is sometimes seen in gardens, and another, of the original blue, with the blossoms double.

9. HERB-ROBERT—*Gera'nium Robertia'num.*

Hedgebanks, especially where rough and stony; ruins; natural rockwork in woods, cloughs, and other shady places; mossy trunks of trees that have been cut down and are gone to decay; also on the thatched roofs of old cottages, and in the chinks of their crumbling walls, holding on by a mere thread. Common everywhere. Fl. all summer. Annual.

Curtis, i. 52; E. B. xxi. 1486.

A curious and independent plant, content to live anywhere, and commending itself wherever met with, by the bright rose-hue of its pretty white-streaked blossoms, the lightness and elegance of its branches and foliage, and the long continuance of its cheerful flowers, which last from before midsummer till November. Unfortunately it has a strong and, to most people, disagreeable odour, resembling that of foxes. Once in the season or so it may be found with the petals pure white. "Robert" is probably a corruption of *rob* or *rub*-wort, the Red plant; the branches, and the leaves also, towards autumn, being remarkable for their vivid redness. "Herb" would be subsequently prefixed, when the original idea was lost in that of a fancied dedication, just as Pellitory, or "the mural plant," has been doubled into Pellitory-of-the-wall.

A variety with glabrous capsules and smaller flowers is distinguished by some under the name of *Gera'nium purpu'reum* or *Raii.* (E. B. Supp. i. 2648.) It occurs abundantly upon the southern and western coasts both of England and Wales.

10. DOVE'S-FOOT CRANE'S-BILL—*Gera'nium mol'le.*

Waysides and cultivated fields, especially among clover; common. Fl. spring—autumn. Annual.

Curtis, i. 123; E. B. ix. 778.

Recognised at all times by its circular and deeply-cut leaves, and conspicuously dense clothing of soft hairs.

11. DUSKY CRANE'S-BILL—*Gera'nium phæ'um.*

Rocky woods and thickets; sometimes by dry waysides. Rare, and chiefly in the north of England. Bakewell; Cheshire; Lake district. Fl. May, June.

E. B. v. 322 (coloured too red.)

Often seen in gardens, where it is called "mourning-widow," and from which, when seemingly wild, it is not improbably a runagate or castaway.

12. BASHFUL ROSE CRANE'S-BILL—*Gera'nium dissec'tum.*

Newly-broken fields, where the soil is light, waysides, and hedgebanks; common, and flowering, like its congeners, from May to the close of autumn. Annual.

Curtis, ii. 409; E. B. ix. 753.

Well distinguished by the deeply-divided leaves, which are hairy, not downy; and the very short stalks of the brilliant but timid flowers, which sit half-concealed amid the topmost foliage.

13. SLENDER CRANE'S-BILL—*Gera'nium columbi'num.*

Hedgebanks and dry waysides, chiefly where the soil is calcareous, but by no means confined to limestone; rather rare, and in Scotland particularly so. Fl. June—September. Annual.

E. B. iv. 259.

The very opposite of the preceding in respect of its flower-stalks, which are frequently three or four inches long. Pollen *blue.*

14. ROUND-LEAVED CRANE'S-BILL—*Gera'nium rotundifo'lium.*

Dry borders of fields, waste places, and by waysides, where there is little moisture; rare, and chiefly in the south. Fl. June, July.—Annual.

Curtis, iv. 634; E. B. iii. 157.

15. SHINING CRANE'S-BILL—*Gera'nium lu'cidum.*

Rocks, walls, dry banks, among heaps of fallen stones, where somewhat damp, often also upon cottage roofs, ruins of abbeys, &c.; common where the soil is calcareous. Fl. May—July. Annual.

Curtis, iii. 514; E. B. ii. 75 (leaves incorrect.)

A strikingly pretty plant, the glossy foliage, bright red stems, and pink flowers, distinguishing it at a long distance from all neighbours.

The geraniums which so deliciously scent our green-houses with their warm aroma, are botanically called *Pelargo'niums.* They are mostly the results of ingenious culture, no plants owing more to the skill of the gardener, and are varieties chiefly of the *P. speclo'sum.* The old-fashioned scarlets, with narrow petals, and flowers in dense umbels, which thrive so well in the open borders, along with verbenas and other ornaments of the autumn, comprise the *P. inquinans*, with the foliage of a plain green, and the *P. zona'le*, or "horse-shoe," distinguished by the broad, purple, arch-like band upon every leaf. The beautiful pale-green, slender-stemmed species, well named the "ivy-leaved," is the *P. pelta'tum*, and the little lemon-scented geranium, with pinnatifid leaves, the *P. quercifo'lium.* In addition to these there are the *Phymatan'thus tri'color,* (Bot. Mag. vii. 240.) different kinds of *Monso'nia*, and numerous species of true *Geranium*, all from the Cape of Good Hope, but now seldom cultivated, except in Botanic Gardens. Many of the last-named have tuberous roots. It is worthy of remark that contrary to what occurs with most of the great genera of the Cape, *Pelargonium* is also met with in Australia, from which country we have the *P. austra'le* and the *P. littora'le.*

The cuticle of the petal of any species of Pelargonium, when put in water, and moderately magnified, is one of the richest microscopic objects that flowers afford.

The favourite hardy species are the *G. stria'tum*, or pencilled geranium, resembling the *Lancastriense* in the veining of its petals, but larger in growth, and with smaller blossoms; the Iberian, or *G. Iberi'icum*, closely resembling the indigenous *G. praten'se*, but with the leaves less divided; the *G. macrorhi'zon*, and the *G. Wallichia'num.*

XII. THE FLAX FAMILY.—*Lina'ceæ.*

Herbaceous or undershrubby plants, the common species delicate and slim. Leaves small, simple, entire, usually narrow, and always without stipules. Flowers regular, of three, four, or five extremely fugitive petals, usually blue or white, occasionally red or yellow. Sepals and stamens corresponding in number with the petals; styles several, and distinct; stigmas capitate; capsule nearly globular, separating into as many pieces as there are styles, without leaving a central pillar, and containing two flat, shining, and inverted seeds in each compartment.

Europe and the north of Africa are the principal stations of this family, which is scattered, however, nearly all over the globe. The tenacity of the fibres of the stems, exhibited in linen and the finer descriptions of string; and the mucilaginous character of the seeds, familiar in the domestic applications of linseed, which is the produce of the same plant that yields the flax of the weaver, and which supplies also the linseed-oil of commerce, render the principal species highly interesting and important, while a few others, such as the white mountain flax, and the Peruvian *Linum selaginoides*, are useful in medicine, as bitters.

Five grow wild, or have become naturalised in Britain.

A.

PARTS OF THE FLOWER IN FOURS.

A minute plant, seldom more than one or two inches high, with dichotomous branches; egg-shaped, opposite, sessile leaves; and white, axillary flowers.
1. ALL-SEED.

B.

PARTS OF THE FLOWER IN FIVES.

I. Flowers minute, *pure white*. Stems many from the same root, 6—8 inches high, much forked at the upper part, and the ends drooping gracefully until the blossoms open. Lower leaves opposite; oblong or oval.
2. WHITE MOUNTAIN FLAX.

II. Flowers *purplish blue*, in loose terminal corymbs. Leaves alternate. Stems 1—3 feet high.

1. Sepals all pointed.

Stems erect, mostly solitary, usually branched only at the upper part, and perfectly glabrous. Leaves lanceolate, erect. Petals blue, notched. Annual. 3. COMMON FLAX.

Stems decumbent, many from the same root. Leaves linear. Flowers small, pale blue. Duration variable.
4. PALE NARROW-LEAVED FLAX.

2. Sepals, or at least the inner ones, obtuse. Stems erect or decumbent. Flowers deep blue. Perennial.
5. PERENNIAL FLAX.

HABITATS AND DISTRIBUTION.

1. ALL-SEED—*Radi'ola Millegra'na.*

On sandy moors, especially in spots liable to be overflowed, or apt to collect rain, common. Fl. July, August. Annual.

E. B. xiii. 893; Baxter, iii. 188.

2. WHITE MOUNTAIN FLAX—*Li'num cathar'ticum.*

In dry fields, and especially fond of green declivities of pastoral hills, common and abundant everywhere. Fl. June—August. Annual.

Curtis, i. 164; E. B. vi. 382.

3. COMMON FLAX—*Li'num usitatis'simum.*

Occurs in fields, among corn and other crops; the seeds, like those of the opium-poppy, originally brought from the East. Fl. July. Annual.

Curtis, ii. 314; E. B. xix. 1357; Baxter, v. 353.

Often grown in gardens, as an ornamental annual.

4. PALE NARROW-LEAVED FLAX—*Li'num angustifo'lium.*

Dry waste land and by road-sides, chiefly upon limestone, in the south and west. Near Walmer, Kent, abundant. Isle of Wight. Not found in Scotland. Fl. June, July. Annual and perennial.

E. B. vi. 381.

5. PERENNIAL FLAX—*Li'num peren'ne.*

Dry waste land in the eastern counties; rare. Fl. summer.

E. B. i. 40.

Occasionally in gardens, where also are found *Li'num fla'vum*, (Bot. Mag. ix. 312.) the very ornamental annual *Li'num grandiflo'rum*, with flowers of a brilliant crimson, the blue *Li'num Austri'acum*, (xxvii. 1086.) the *Li'num campanula'tum*, the *Li'num Berendie'ri* from Texas, (lxiii. 3480.) and several others. The best of the greenhouse kinds is the yellow Indian, *Li'num trigy'num* (xxviii. 1100.) *Li'num arbo'reum* (vii. 234.) is shrubby. *Li'num monogy'num*, from New Zealand, has large white flowers, and a solitary style. *Li'num quadrifo'lium* (xii. 431.) has yellow flowers, and leaves in whorls of four.

XIII. THE WOOD-SORREL FAMILY.—*Oxalida'ceæ.*

Half of this family consists of shrubs and trees, belonging exclusively to the hotter regions of the world; the remainder are delicate herbaceous plants, natives of temperate and northern latitudes. Our present concern is with the latter, or the true wood-sorrels. Seldom rising more than a few inches above the ground, these elegant little plants may in general be recognised by their trifoliolate or digitate leaves, supported on long petioles, and in flavour agreeably acid; and by their regular and pentamerous flowers, white, yellow, or pink, spirally twisted while young, and growing either upon solitary peduncles or in little umbels. Stamens ten, the five inner ones longer than the five outer; ovary solitary; styles five; stigmas capitate. The fruit is a five-angled and five-celled capsule, in figure, when mature, either ovoid or elliptical, and containing either five or many seeds. These, as soon as ripe, are jerked out by the contraction of a peculiar membrane which invests them, and opens down the outer side. Some of the exotic species of Oxalis have pinnate leaves, and in others no proper leaves are developed, their place being supplied by dilated leafstalks or "phyllodia." These latter kinds are often shrubby, as in the *Ox'alis frutico'sa* of Rio Janeiro. (Bot. Reg. N. S. iv. 41.)

One species is indigenous to Britain, and two others have become naturalised, or are in course of becoming so.

A.

Flowers solitary, pendulous, white, with purple veins, occasionally purple or rose-coloured; the peduncles and the leaves alike from the rhizome, which is red and beaded. Leaves trifoliolate, the leaflets horizontal in bright weather, bent downwards and backwards so as to form little pyramids when wet and cloudy. Petals lightly coherent near the base. 1. COMMON WOOD-SORREL.

B.

Flowers pale yellow, in umbels of 2—4—5. Leaves trifoliolate. Stems developed, 3—6—12 inches long or high.

Petioles with lanceolate stipules. Petals notched.
2. PROCUMBENT YELLOW OXALIS.

Stipules none. Petals without a notch. 3. UPRIGHT YELLOW OXALIS.

HABITATS AND DISTRIBUTION.

1. COMMON WOOD-SORREL—*Ox'alis Acetosel'la.*

Few are the groves and shady banks where the pencilled blossoms of this dainty little plant may not be found, like silver bells among the moss, companions of the later primroses and the scentless violet, and succeeding the anemones and the pilewort. The leaves, which are of a bright and delicate green, and often purple underneath, are scarcely in perfection till the season is further advanced. The pink variety is rare, but probably occurs somewhere every year, amid the crowd of blossoms "born to blush unseen."

Curtis, i. 104; E. B. xi. 762; Baxter, v. 327.

The wood-sorrel is interesting from its near approach to the nature of sensitive-plants. All the Oxalids have a tendency this way, opening and closing their leaves with the changes of the atmosphere and the alternations of light and darkness, and some are even sensitive to the touch. The *Acetosel'la* agrees with them in its deference to moisture and sunshine, refusing only to make obeisance to the finger. The mode in which the leaflets fold together is remarkable. While in pinnate leaves that close and open, the leaflets rise and draw together face to face; here, as in the digitate leaf of the lupine, which is like a wood-sorrel leaf on a great scale, they bend downwards and form a pyramid, the summit of the petiole becoming the apex. The wood-sorrel is the badge of the sister country,—

Chosen leaf
Of bard and chief,
Old Erin's native Shamrock.

2. PROCUMBENT YELLOW OXALIS—*Ox'alis cornicula'ta.*

A species probably of North American origin, now extensively naturalised in many parts of the world, and frequently springing up in English gardens, without having been intentionally sown. Fl. May—July. Annual.

E. B. xxiv. 1726.

In the island of Ceylon this little plant has been observed growing at a height of 7,000 feet above the sea. The *Ox'alis re'pens* of the Mauritius, a common weed in orchid-houses, is probably not distinct in specific characters.

3. UPRIGHT YELLOW OXALIS—*Ox'alis stric'ta.*

Certainly North American, and occurring, like the *cornicula'ta*, not infrequently as a garden weed. In arable fields, gardens, and orchards near Bideford, and near Penzance, very common. Fl. summer. Annual.

The cultivated Oxalidaceæ comprise not less than 50 from the Cape of Good Hope, closely resembling the English species, but larger and more succulent, a few others from the Brazils, and a charming plant called *Biophy'tum*, (Bot. Reg., 2nd Series, viii. 68.) which lifts a rosette of pinnate and sensitive leaves upon the summit of a little column,—a palm, or tree-fern, as it were, in miniature. They are seldom seen out of the green-house. Among the prettiest of the hardy ones are *Ox'alis floribun'da, ro'sea,* and *tropæoloi'des.*

XIV. THE LIME-TREE FAMILY.—*Tilia'ceæ.*

In England this family is scarcely known except in the typical and arborescent genus *Tilia,* the members of which are familiar as Lime or Linden trees, and may be distinguished by the characters given below. The tropical representatives are often widely unlike Linden-trees; some are even herbaceous, and many more answer very indifferently to the technical diagnosis under which the family is described by botanical authors.

Leaves simple, roundish, serrated, pointed, alternate, and petioled, the blade larger upon one side of the midrib than upon the other. Flowers small, buff-coloured or yellowish, borne in little clusters upon the front of a winged stalk. Sepals and petals each five; stamens 20—30; ovary single. Fruit a dry, brownish and usually velvety nut, the size of a pea, five-celled in reality, but only one seed usually comes to perfection, and renders it apparently one-celled. In spring, before the leaves appear, lime-trees may be distinguished by their egg-shaped and glabrous red buds; and when without flowers, by the little tufts of hairs in the angles of the principal veins upon the

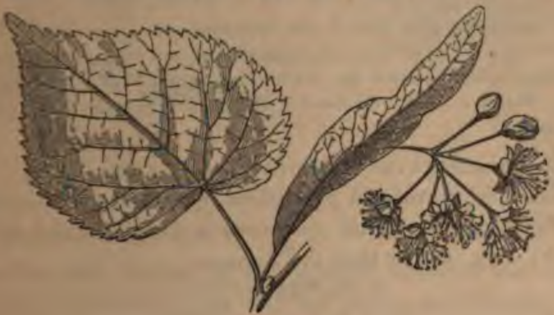

Fig. 91.
Common Lime-tree—*Tilia Europæa.*

underside of the unsymmetrical leaf. They are remarkable for the toughness of their inner bark, which readily separates into thin layers, and is extensively used as string by gardeners, under the name of "bast," and in Russia, for making mats and cordage.

Three species occur in Britain, but they are probably only modifications of a single form.

1. Leaves glabrous on both surfaces, excepting the woolly tufts in the angles of the veins below; flowers 3—6 in a cluster. COMMON LIME-TREE.
2. Leaves glabrous upon the upper surface, white and downy upon the under; young shoots hairy; flowers 1—3 in a cluster; fruit prominently ribbed. BROAD-LEAVED LIME-TREE.
3. Leaves glabrous upon the upper surface, glaucous underneath, with scattered as well as axillary tufts of wool; umbels compound, many-flowered; fruit nearly glabrous. SMALL-LEAVED LIME-TREE.

HABITATS AND DISTRIBUTION.

1. COMMON LIME-TREE—*Til'ia Europæ'a.*

Abundantly in parks and pleasure-grounds, and very beautiful as an avenue or lawn tree. Fine specimens often occur near old mansions. When occurring in woods and groves, it is only as a naturalised descendant of immemorial planting. Fl. July.

Curtis, iv. 620; E. B. ix. 610; Baxter, iv. 293.

Fenelon makes the lime one of the ornaments of the enchanted island of Calypso. The interior of the mass of boughs is very apt to be filled with a brushwood of twigs, which becomes an asylum for small birds. The flowers are delightfully fragrant; they well deserve the epithet "honied," and allure the bees in legions.

2. BROAD-LEAVED LIME-TREE—*Til'ia grandifo'lia.*

Occasionally in groves and plantations, and, like the *Europæa*, no doubt of foreign origin. Fine specimens at Penshurst and Waltham Abbey. Fl. July, earlier than the *Europæa.*

E. B., Supp. ii. 2720.

3. SMALL-LEAVED LIME-TREE—*Til'ia parvifo'lia.*

Woods, especially in the southern counties, common. Leigh Woods. Fl. July, later than the *Europæa.*

E. B. xxiv. 1705.

The only species of Tilia that appears to be truly indigenous in our country.

The most beautiful of the greenhouse *Tiliaceæ* is the *Sparman'nia Africa'na,* (Bot. Mag. xv. 516.) a native of the Cape of Good Hope, and forming a shrub about six feet high. The flowers are borne in umbels like those of *Pelargoniums;* the calyx and corolla are both as white as snow, while the numerous stamens are of a fine purple colour.

XV. THE MALLOW FAMILY.—*Malva'ceæ.*

A large and very interesting family, comprising trees, shrubs, and herbs, mostly handsome and ornamental, and in some cases of the highest worth to man. Leaves simple, alternate, fan-veined, petioled and stipuled, and more or less divided into lobes. Flowers axillary, regular, with five distinct petals, which are frequently cleft or deeply notched, five partially united sepals, and frequently an outer calyx or involucrum of at least three more. Stamens numerous, with long filaments that are gradually shorter outwards, and united for three parts of their length, so as to form a tube or cylinder, which encloses the ovaries and styles, leaving only the stigmas exposed to view. The anthers form a tuft immediately beneath the stigmas, presenting, with the cylinder, the image of a little tree, strikingly characteristic of the family. When magnified, the anthers are found to be kidney-shaped and one-celled. The fruit, in all the British, and most of the hardy cultivated species, consists of thin achenia, arranged edgeways in a whorl round the base of the withered styles, and forming a thick, flat mass, the shape of a cheese. The pollen-grains, which are globular, and covered with spinous projections, form a very interesting object for the microscope.

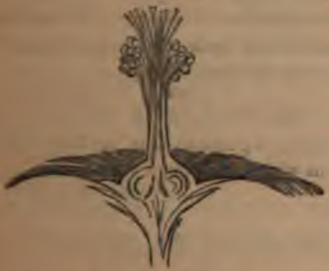

Fig. 92.
Section of Mallow flower.

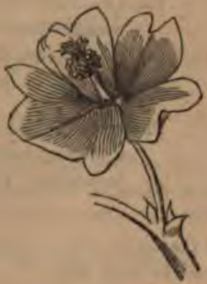

Fig. 93.
Flower of Mallow.

This fine tribe of plants, numbering about 1,000 known species, has its chief seat in the tropics, where it is arborescent, and continues plentiful in the hotter parts of temperate countries, but gradually diminishes towards the north, and is faintly represented in the end by a few weeds of the wayside. It abounds universally with mucilage, and is not in a single instance deleterious. Several species are of use to the physician. Others furnish fibres suitable for the manufacture of mats and coarse cordage. Cotton, in all its varieties, American, Egyptian, and Surat, is the hairy covering of the seeds of different species of *Gossyp'ium.* "Cuba bast," the material which is supplanting the common lime-tree bast, as used by gardeners instead of twine, is the inner bark of the *Paritium elatum.*

Five species of Malvaceæ appear to be truly indigenous, and two or three others are more or less naturalised. *Malva borea'lis* (the *M. pusilla* of E. B. iv. 241.), a variety of the *rotundifolia,* with smaller petals, formerly found in Kent, is not now considered a British plant.

A.

Bracts of the involucrum united at the base, and forming a *distinct* outer calyx.

1. Bracts of the involucrum *three,* often larger than the sepals. Stem shrubby, branched, usually several feet high. Leaves divided into 5—9 broad and crenate lobes. Flowers purplish-red, with darker veins, disposed in long terminal and racemose panicles. 1. Seaside Lavatera.

2. Bracts of the involucrum 5—20. Plant erect.

   Plant 2—3 feet high, branched, velvety in every part with dense and whitish down. Leaves undivided or 3-lobed. Flowers pale rose-colour, almost sessile in the axils of the upper leaves, or disposed in terminal and leafless spikes. 2. Common Marsh-mallow.

   Plant seldom more than 12 inches high, rough with long, stiff, spreading hairs. Flowers pale purplish-blue, on long axillary peduncles. Upper leaves with 3—7 narrow segments. 3. Hairy Althæa.

B.

Bracts of the involucrum unconnected, not more than three, and inserted *upon* the true or inner calyx.

1. Flowers in axillary clusters, among the leaves.

   Stems 1—3 feet high, more or less spreading. Leaves with short broad lobes, not reaching to the middle. Petals three or four times as long as the calyx, violet-purple, with darker veins, and deeply-notched. Fruit-stalks erect. 5. Violet Mallow.

   Stems 6—12 inches long, prostrate or nearly so. Leaves circular, with 5—7 very short and broad crenate lobes. Petals not more than twice the length of the calyx, pale-blue, and insignificant. Fruit-stalks bent down. 6. Dwarf Mallow.

   Like the Dwarf Mallow, but the stem quite erect, and the flowers in close clusters, resembling a little hollyhock. 7. Whorled Mallow.

2. Flowers crowded at the summit of the stem and the extremities of the branches. Petals large and light rose-colour. Stems 18—24 inches high. Leaves deeply cut into narrow lobes (rarely reniform and slightly lobed). 4. Musk Mallow.

HABITATS AND DISTRIBUTION.

1. Seaside Lavatera—*Lavate'ra arbo'rea.*

Rocks by the seaside, chiefly upon the south and west coasts of England, Wales, and Ireland. In the north very rare. Very common in gardens near the sea, in the south and west. Fl. July, August. Biennial.

E. B. xxvi. 1841; Baxter, ii. 106.

2. Common Marsh-mallow—*Althæ'a officina'lis.*

Salt marshes and on the banks of tidal rivers, in the south of England and in Ireland. Fl. August, September.

E. B. iii. 147; Baxter iii. 226.

3. Hairy Althæa—*Althæ'a hirsu'ta.*

Naturalised upon the borders of one or two fields near Cobham, Kent; the seeds accidentally imported, like those of many other plants of the south of Europe. Fl. June, July. Annual.

E. B. Supp. i. 2674 (too red.)

4. Musk Mallow—*Mal'va moscha'ta.*

Hedgebanks, waysides, and borders of dry fields; common as far as the south of Scotland. Fl. July, August.

Curtis, ii. 270; E. B. xi. 754; Baxter, i. 25.

The petals, when dried, are of singularly delicate texture, and as filmy as some seaweeds. In warm summer evenings, the flowers yield the odour of musk. A white variety is common in gardens, and occasionally appears in the wild state.

5. Common Purple Mallow—*Mal'va sylves'tris.*

Roadsides and waste places, (never in woods, as its name would seem to imply); an abundant and beautiful wild-flower of the south, and generally upon limestone. Fl. June—September.

Curtis, i. 124; E. B. x. 671 (coloured too red.)

6. Dwarf Mallow—*Mal'va rotundifo'lia.*

Dry waysides and borders of fields, and in and about farm-yards; common. Fl. May—September.

Curtis, i. 188; E. B. xvi. 1092.

7. Whorled Mallow—*Mal'va verticilla'ta.*

Naturalised or partly so, in cornfields near Llanelly, Caermarthenshire; its origin and history similar to that of the *Althæ'a hirsu'ta.* Fl. summer.

E. B. Supp. iv. 2953.

The tall and stately spires of the hollyhock, *Althæ'a ro'sea*, with flowers like roses, yellow, white, claret-colour, or pink, often double or semi-double, and the calyx covered with soft hairs, give an exceedingly good idea of the noble character often attained by the exotic malvaceous plants. Their beauty is further illustrated in the greenhouse genera *Hibis'cus*, *Acha'nia*, and *Abu'tilon*, one species of which latter, the *A. stria'tum*, is tolerably common, bearing abundance of pendulous oval bells, the size of an acorn, on peduncles 3—5 inches long, the petals deep yellow, and laced with crimson. Several pretty *Malvas* are also frequent in gardens and conservatories; one of the oldest favourites is *Malva Capen'sis. Lavate'ra Ol'bia*, *Lavate'ra trimes'tris*, (Bot. Mag. iv. 109.) the "Bladder Ketmia," *Hibis'cus Trionum*, (vi. 209.) the *Hibis'cus Rosa-Sinen'sis*, (v. 158.) the "Althæa-frutex," *Hibis'cus Syria'cus*, (iii. 83.) and the *Nuttal'lia Papa'ver*, from Arkansas, (lx. 3287.) are also more or less common. *Malope trif'ida*, with oblique, deep-coloured petals, is now a universal garden annual. Different species of *Gossyp'ium* may likewise be seen in greenhouses, and in Lancashire are grown also in the engine-houses belonging to cotton-factories.

XVI. THE CAMELLIA FAMILY.—*Ternströmia'ceæ.*

Beautiful trees and shrubs, Chinese in their most interesting species, but natives principally of the forests of South America. The Asiatic species include the tea-tree or *The'a vir'idis*, (Bot Mag. xxv. 998.) the Assam tea-tree, and the lovely and well-known flower which gives name to the family, and which is the only member of it in ordinary cultivation. Now the glory of every greenhouse in early spring, and, in sheltered places near the sea, blossoming abundantly out-of-doors, it was only in 1729 that the Camellia was introduced, and then only to be destroyed by being treated as a stove-plant. New plants were obtained in 1742. In choice collections are sometimes seen the *Gordo'nia Lasian'thus* (xvii. 668.) and one or two species of *Stuar'tia*.

XVII. THE CISTUS FAMILY.—*Cista'ceæ.*

The Cistaceæ are, for the most part, shrubby and upright. Sometimes they are prostrate upon the ground, and in that case have wire-like but woody stems, and are evergreen or nearly so. A few are annuals. Leaves simple, entire, never dotted as in the St. John's-worts (plants which the Cistaceæ in several points closely resemble); flowers regular, rosaceous, white, yellow, or reddish, usually of great beauty, and very fleeting; sepals three, equal in size, often with two additional ones outside, which are sometimes much smaller; petals five, usually crumpled like those of poppies; stamens numerous, seated on the receptacle, their filaments free at the base; ovary single, one or many-celled; seeds numerous.

Cistuses belong almost exclusively to the countries and islands bathed by the Mediterranean, and number about 200 species. A few are resinous and balsamic, as the delicious gum-cistus or *C. ladanif'erus*, the large white crumpled petals of which, a deep crimson-purple spot at the base of each, strew the ground almost before we can admire them.

Four species grow wild in Britain. A fifth was formerly accounted native, the annual *Helian'themum ledifo'lium* or *Cistus ledifo'lius*, (E. B. xxxiv. 2414.) but the assigned locality, Brent Downs, Somersetshire, appears to furnish it no longer.

A. *Plant annual*, erect, 3—12 inches high. Leaves varying from obovate to lanceolate, the upper ones with stipules. Flowers yellow, generally with a deep-red spot at the base of every petal. 3. SPOTTED CISTUS.

B. *Plant perennial*, the stems wiry and trailing.

  1. Leaves without stipules, hoary underneath. Flowers small and plain yellow. 4. HOARY CISTUS.

  2. Leaves with small stipules, opposite, and ovate-lanceolate. Flowers in little terminal racemes.

    Leaves green upon the upper surface, and nearly flat. Flowers light and bright yellow, the three large sepals prominently ribbed. Capsule three-valved. 2. SUNFLOWER CISTUS.

    Leaves hoary on both surfaces, more or less revolute at the edges. Flowers always white. 1. WHITE CISTUS.

HABITATS AND DISTRIBUTION.

1. WHITE CISTUS—*Helian'themum polifo'lium.*

Brent Downs, Somersetshire, and rocks at Torquay and Babbicombe, Devonshire, are the only known localities for this plant. Fl. summer.

E. B. xix. 1322 (as *Cistus polifolius.*)

2. SUN-FLOWER CISTUS—*Helian'themum vulga're.*

Dry, rocky, and gravelly banks and waysides; among the short turf on breezy downs, and often entangled with mosses and short heath in the green open spaces of dry woods, always preferring calcareous earth; a common and very beautiful little plant. Fl. July —October.

Curtis, ii. 328; E. B. xix. 1321 (both as *Cistus Helianthemum*); Baxter, v. 393.

The bright yellow flowers, often called "rock-roses," are in form like those of a buttercup or potentilla, but much more elegant, and very short-lived, expanding only in warm sunshine, and losing their petals in a few hours. It is rare for more than one of a raceme to open at once. Upon rockeries, where the plant is frequently to be met with, the flowers are sometimes double, and the colour of the petals varies into many shades of red and occasionally to white. The *Cistus Surreja'nus* (not of E. B. 2207, which represents a garden plant) is a state of this species in which the leaves are inordinately developed, and the petals narrowed and cut. The *Cistus tomento'sus* (E. B. xxxi. 2208.) is a variety of the same with downy or hairy foliage.

3. Spotted Cistus—*Helian'themum gutta'tum.*

Dry waste ground in the island of Jersey, and near Cork; very rare. Fl. June, July. Annual.

E. B. viii. 544 (as *Cistus guttatus.)*

"*Helianthemum Brew'eri*" is a small variety with broader leaves, and the flowers bracteated, found upon Holyhead mountain, Anglesea.

4. Hoary Cistus—*Helian'themum ca'num.*

Limestone rocks in the north-west of England, and in Wales, very rare. Humphrey Head, near Morecambe Bay, abundant. Fl. May, June.

Curtis, iv. 621; E. B. vi. 396 (both as *Cistus marifolius.)*

XVIII. THE CABBAGE FAMILY.—*Crucif'eræ* or *Brassica'ceæ.*

Herbaceous plants, varying from an inch to 3 feet high. Leaves simple, alternate, often undivided, then lanceolate or ovate, and frequently auricled, sessile and stem-clasping; still oftener lyrate, or runcinate, deeply-pinnatifid, or *quasi*-pinnate. Divided and undivided leaves frequently occur upon the same plant, but in that case the divided ones are always at the lower part. Flowers in almost all cases regular, composed of four free sepals and four free petals, the latter placed in opposite pairs, as in Fig. 96, and constituting a "cruciform" or "cross-shaped" flower. Inflorescence beginning as a terminal corymb, afterwards in most cases, a long upright raceme, the lower flowers generally over-blown and succeeded by the young seed-pods, and even by ripe ones, before the topmost have expanded. Every stage between flower-bud and fruit is thus presented at a very early period—a fortunate circumstance in a family the members of which can hardly ever be discriminated in words without reference to the pods and seeds. Stamens six; four long and two short. Ovary single; stigmas two, sessile, occasionally fused into a single body. When ripe, the seed-pod consists in almost every instance of two thin walls, separated by a delicate and transparent white partition, having the seeds attached to its surfaces, and remaining after the external parts have fallen away. When long and narrow, as in Fig. 95, the pod is termed a "silique;" when short and broad, as in Fig. 97, it is called a "silicle," and in either case is peculiar to the family. The thin silvery white membranes left on the peduncles after the outer pieces and the seeds have fallen away, frequently form conspicuous and pretty objects. In the radish and a few others the partition is suppressed. The silicle is sometimes globular, sometimes elliptical, sometimes as flat as if it had been pressed in a book, prettily exemplified in the *Luna'ria* and the *Biscutel'la*. The seeds, upon being opened, present some remarkable differences of structure. There is no separate albumen, and the cotyledons are found to lie in at least three different positions with regard to the embryo. The characters derived from these peculiarities, though too fine for practical use, afford the most natural, and indeed the absolute primary distinctions of the several sections and genera into which the family resolves itself.

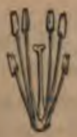

Fig. 94.
Stamens of cruciform flower.

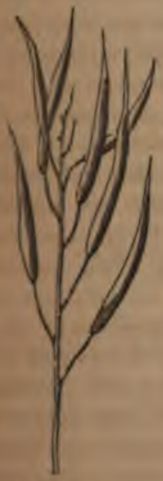

Fig. 95.
Spray of Siliques.

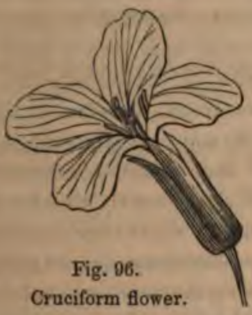

Fig. 96.
Cruciform flower.

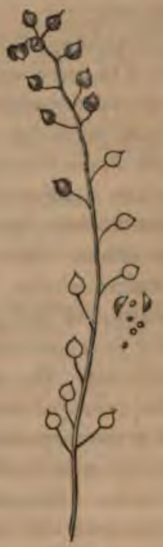

Fig. 97.
Spray of Silicles.

The flowers are almost always numerous, but in general small and inconspicuous, except from their plenty. The squareness and flatness of the corolla in such as the sea-kale is remarkable, and makes them look prim and artificial. They are prone to become double. The petals are usually white or yellow, sometimes red, blue, crimson, or purple, occasionally notched, very rarely laciniated, and seldom absent. Perfume is not often evolved, but when present, it is strong and aromatic. That of the *Hesperis* and some others is given forth only in the evening, or after sunset. In some species the stamens are nearly of equal length; occasionally there are only four, or even no more than two.

The Cabbage Family, though not one of the most shewy or extensive, is in every way valuable and interesting. The rare uniformity of its structure renders it highly deserving the attention of the botanical student, while the uses it subserves makes it important to all. Not a single unwholesome plant occurs in it, while very many species form excellent articles of food, as cabbage, "greens" of nearly all kinds, the cauliflower, broccoli, turnip, sea-kale, water-cresses, and the pungent radish. The general properties of the family are stimulant and antiscorbutic, with now and then a little acridity superadded. Mustard-seed and the root of the horseradish, in which the acrid matter is somewhat concentrated, become on this account, agreeable condiments. The seeds of many species contain abundance of oil.

The principal seats of these plants are northern Europe and Asia, though they are scattered thinly nearly all over the world. Upwards of 200 grow in the frigid zone, where they constitute a large part of the vegetation. Sixty-five or seventy species are indigenous to the British Islands, some authors raising the number to nearly eighty. Of exotics more or less naturalised, there are also a good many; and the number, as happens in the pea-family, seems likely to increase, the following, besides those generally included in Floras, being in process of settlement with us:—

Sisym'brium polycera'tium, allied to *S. Irio*.
Erys'imum virga'tum.
Malco'mia marit'ima, the well known "Virgin-stock."
Lepid'ium sati'vum, common garden salad-cress.
Alyss'um inca'num or *Bertero'a inca'na.*

Two formerly reckoned British, are now omitted from the lists, namely, the little *Vel'la an'nua* (E. B. xxi. 1442; Baxter, vi. 420.) and the *Cardami'ne bellidifo'lia* (E. B. xxxiii. 2355.)

SECTION I.

PETALS PRESENT. FLOWERS YELLOW.

A.

All the leaves simple and undivided, entire or occasionally serrate.

I. Flowers upon leafless scapes, brilliant yellow. Leaves lanceolate, ciliated, and crowded into rosulate tufts. Plant 1—3 inches high. 22. YELLOW ROCK DRABA.

II. Flowering-branches more or less leafy.

1. Leaves all lanceolate, tapering into a short petiole, entire or slightly toothed.

Pods linear, flattened, and 2—3 inches long. Stigma two-lobed. Flowers conspicuous. Plant perennial. Stem woody. 53. WALL-FLOWER.

Pods linear, seldom an inch long. Stigma undivided. Flowers small and pale. Plant annual or biennial, 1—2 feet high. 50. WORM-SEED.

Pods oval or circular, concealed in the persistent calyx. Flowers minute, very pale. Plant annual, 3—4 inches high. 28. LITTLE YELLOW ALYSSON.

2. Stem-leaves auricled and sessile.

a. Pods pendulous, dark-brown, thrice as long as broad, one-celled and one-seeded. Radical leaves crenate and petiolate. Upper leaves acutely arrow-shaped at the base. Bracts numerous and yellowish. Plant 2—3 feet high. 5. WOAD.

b. Pods erect and many-seeded. Petals usually pale.

Pods obovoid and with long peduncles. No bracts. Plant 1—2 feet high. 26. CAMELINA.

Pods linear. Plant everywhere glabrous, 1—2 feet high. Leaves elliptic heart-shaped. Petals very pale. 51. HARE'S-EAR ERYSIMUM.

Pods linear, curved outwards. All the leaves hairy and serrate. 48. TOWER ARABIS.

Pods linear. Upper leaves glabrous and entire. 49. TOWER-MUSTARD.

3. Stem-leaves ovate and pointed, with a few coarse serratures. Upper ones nearly sessile, but not auricled. 60. CHARLOCK.

B.

Leaves, or at least the lower ones, more or less lyrate, pinnatifid, or *quasi*-pinnate; sometimes runcinate; sometimes doubly-pinnatifid.

I. Both stem and branches (if any) remarkably erect and stiff, and glabrous or nearly so. Pods linear. Seeds in a single row.

a. Calyx erect. Leaves strongly-veined. Flowers golden-yellow. Upper leaves oblong and toothed. Stem angular and furrowed. Plant perennial. 34. COMMON YELLOW-ROCKET.

Upper leaves pinnatifid. Pods very long. Plant biennial, and slender. 35. EARLY YELLOW-ROCKET.

b. Calyx spreading. Flowers very small. Annual. 42. LONDON-ROCKET.

II. Branches *spreading;* the stem rarely simple and erect. Plant often hairy or bristly.

- 1. *Petals not longer than the calyx, usually minute.*
    - Leaves lyrate-pinnatifid, unequally toothed. Pods short, curved, bulging, and bending away from the stem. Plant bushy, diffuse, glabrous, 12—18 inches high. 37. LAND YELLOW-CRESS.
    - Leaves doubly-pinnatifid, the lobes linear, rendering the abundant foliage elegantly feather-like. Plant 18—30 inches high. Flowers greenish-yellow. 41. FLIX-WEED.
- 2. *Petals longer than the erect calyx, large and conspicuous, veined with blueish-violet or greenish-yellow.*
    - Plant annual, 2—3 feet high, coarse, rough, spreading, and untidy. Stem leafy. Seed-pods spongy, and with 4—8 *transverse* partitions. Lower leaves lyrate. 66. WILD RADISH.
    - Plant usually perennial. Stems generally simple, 6—12 inches long, procumbent, and glabrous. Leaves *quasi*-pinnate; the segments linear. Pods with a partition from bottom to top. 59. ISLE-OF-MAN BRASSICA.
- 3. *Petals longer than the calyx, and without coloured veins.*
    - *a.* Seed-pods short, erect, and *pressed close to the stem* or branch.
        - All the leaves more or less runcinate or lyrate. Plant rough and wiry. Branches spreading horizontally, long and slender, thickly set with the little appressed pods, and terminating in small clusters of minute lemon-shaped blossoms. 40. COMMON HEDGE-MUSTARD.
        - Upper leaves linear-lanceolate, and entire or nearly so.
            - Pods ending in the slender persistent style. Plant bushy, 3—4 feet high. Lower leaves large, roughish, with scattered bristles; variously lobed and toothed. Seeds brown. 61. GROCERS' MUSTARD.
            - Pods ending in a distinct one-seeded beak. Plant gray with short bristly hairs. 63. HOARY SINAPIS.
    - *b.* Seed-pods *not pressed against the stem;* generally spreading.
        - * Seed-pods short, more or less curved and bulging, and without terminal beaks. Seeds in two distinct rows, but seldom perfected. Amphibious or water-side plants; rarely on dry land.
            - Leaves pinnatifid and serrated. Plant 2—3 feet high. Stem not creeping. Pods not exceeding a quarter of an inch in length. Perennial. 38. GREAT AMPHIBIOUS YELLOW-CRESS.
            - Leaves *quasi*-pinnate, the lobes cut. Flowering-branches 12—18 inches high. Stem creeping at the base. Racemes remarkably zig-zag. Pods half an inch long or more. Annual. 39. CREEPING YELLOW-CRESS.

** Seed-pods long, sometimes linear, and usually full of perfect seeds. Dry-land plants, unless casually near water.

+ Upper stem-leaves undivided and sessile, or stem-clasping. Lower leaves variously cut. Flowers large and showy. Calyx erect. Plant 3 inches to 3 feet high.

Radical leaves more or less hispid. Upper leaves auricled. Root more or less fleshy, and spindle-shaped or globular. 57. WILD TURNIP.

All the leaves glabrous and glaucous. Upper leaves not auricled. Petals lemon-coloured. 58. WILD CABBAGE.

++ All the leaves more or less cut and divided, runcinate, lyrate or *quasi*-pinnate.

a. Calyx *spreading*. Pods bulging, usually hairy, beaked, many-angled, and rugged. *Seeds not more than six in each cell.* Plant rough, 1—2 feet high. Flowers conspicuous.

Pod shorter than the beak, and very hispid. 62. SALAD MUSTARD.

Pod much longer than the beak, glabrous or rough. 60. CHARLOCK.

b. Calyx *spreading*. Pods slender and glabrous. *More than six seeds in each cell.*

Perennial, glabrous, smelling disagreeably when bruised. Branches diffuse. Flowers large, lemon-coloured. Peduncles spreading. 64. PERENNIAL WALL SINAPIS.

Annual; like the former in all respects, but smaller and the stems hairy. 65. ANNUAL WALL SINAPIS.

Annual. Peduncles and pods nearly erect. Leaves runcinate and toothed. Plant glabrous. Flowers small. 42. LONDON ROCKET.

c. Calyx *erect*. Stems 6—12 inches high, nearly leafless. Plant glaucous, perennial, often procumbent. Flowers large. Seed-pods smooth. 59. ISLE-OF-MAN BRASSICA.

SECTION II.

ETALS PRESENT. Flowers either *pure white* or white with occasionally a *purple* tinge (the latter marked*); sometimes full purple; occasionally cream-colour.

1. Plant, when bruised, with a strong scent of garlic. Stem 1–3 feet high. Leaves heart-shaped, roundish, veiny, the lower ones upon long stalks. Pods long and slender. 52. GARLICK WHITE-CRESS.

2. Leaves 12—18 inches long and two or three inches broad, much veined and wrinkled, sometimes pinnatifid. Flower-stems 2—3 feet high. Flowers in large panicles, pure white and individually small.
18. Horse-radish.

3. Leaves very large, oblong or roundish, and variously waved and toothed. Plant large, stout and glabrous. Flowers pure white, in large showy panicles, the corolla remarkably square and flat. Seed-pods globular.
2. Sea-kale.

4. Petals of unequal size, the lower pair being longer than the upper. Seed-pods flat and nearly circular. Annuals.
    Central stem leafless, erect, 3 inches high. Two seeds in each cell of the pod. 12. Teesdalia.
    All the stems leafy. One seed in each cell.
    11. Bitter Candytuft.

5. Flowers on leafless scapes, 1—3 inches high; a solitary stem-leaf sometimes present.
    Dry-land plants. Leaves lanceolate, hairy.
        Petals deeply cleft. Seed-pods elliptical. Annual.
        21. Common Whitlow-cress.
        Petals not cleft. Perennial. 23. Highland Draba.
    Plant submerged in water. Leaves awl-shaped, cylindrical.
    20. Subularia.

6. Petals with conspicuously dark or pellucid veins. Plant coarse, rude, and rough with stiff bristles. *Leaves lyrate.* Pods one-celled and jointed.
66. •Wild Radish.

7. Bulbs in the axils of the upper leaves, which are *lanceolate and serrate.* Lower leaves pinnatifid, with five long serrate lobes. Stems simple, 1—2 feet high. Flowers purple. 29. Coral-wort.

8. Leaves *all* more or less deeply-pinnatifid or *quasi*-pinnate.
    a. Seashore plant. Flowers purple, or rarely white, large and handsome. Seed-pods angular, compressed, consisting of two one-seeded joints, the upper one soon falling off. Stem much branched, the branches wavy or zigzag. Whole plant glabrous and succulent. Leaves pinnatifid. 1. Purple Sea-rocket.
    b. Seed-pods roundish or elliptical. Insignificant plants with minute white flowers.
        Lobes of the *quasi*-pinnate leaves *undivided and entire.* Stems 2—3 inches high. Seed-pods elliptical and flat. Seeds two in each cell. 10. Hutchinsia.
        Lobes of the *quasi*-pinnate leaves *notched.* Pods roundish, slightly wrinkled, two-lobed, with one seed in each cell. Stems procumbent. 4. Cornish Wart-cress.
        Leaves *doubly pinnatifid.* Pods roundish, deeply wrinkled, with one seed in each cell. Plant glabrous and weedy. Flowers concealed among the mostly procumbent stems. Stamens often only two or four.
        3. Common Wart-cress.

c. Seed-pods long, slender, and smooth.

Seeds in a distinct *double row* down each division of the pod. Aquatic or water-side plant. Leaflets ovate, sinuate. Plant very succulent. Flowers pure white. 36. Water-cress.

Seeds apparently in a *single row* in each division of the pod. The pods opening elastically when ripe, and the two outer pieces rolling up spirally.

Petals large and spreading. Stems 12—18 inches high.

Lobes of the *stem-leaves* linear and entire. Flowers usually lilac. Anthers yellow. Style straight. 32. *Common Meadow Cardamine.

Lobes of *all the leaves* roundish and angular. Flowers usually pure white. Anthers purple. Style oblique. 31. *Great White Cardamine.

Petals minute and erect. Annuals.

Leaf-stalk with curved, linear, and ciliated *quasi*-stipules. Plant very pale green. Lobes of all the leaves lanceolate and irregularly notched. Stem 12—18 inches high. Petals usually absent. 33. Narrow-leaved Cardamine.

Leaf-stalk without *quasi*-stipules. Lobes of the lower leaves roundish and notched. Stems 2—18 inches high. Flowers always pure white, often with only four stamens. 30. Common Bitter-cress.

9. Seed-pods *heart-shaped*, rather triangular, attached by the lowermost point to long peduncles, and quite flat. Seeds 10—12 in each cell, yellow. Stems 1—24 inches high. Root-leaves usually pinnatifid. Upper ones entire. Flowers white and inconspicuous. 9. Shepherds'-purse.

10. Seed-pods oblong, pointed, *curiously twisted*, and longer than the peduncles. Stem 3—12 inches high. Stem-leaves deeply toothed. Plant hoary with fine and *stellate* pubescence. 24. Hoary Draba.

11. Seed-pods flat, circular, and semi-transparent, *the valves dilated into wings.* Seeds numerous in each of the cells. Plant glabrous. Upper leaves stem-clasping. Flowers white and inconspicuous.

Annual. Style included, or nearly so, within the notch of the pod.

Seeds striated, usually six in each cell. Pods half-an-inch broad. Upper leaves arrow-shaped at the base. 6. Penny-cress.

Seeds not striated, usually four in each cell. Upper leaves cordate at the base. 7. Perfoliate Thlaspi.

Perennial. Style projecting beyond the notch of the pod. Upper leaves arrow-shaped at the base. 8. Mountain Thlaspi.

12. Seed-pods circular, oval, or globular, without marginal wings.

Lower leaves pinnatifid. Upper leaves linear and entire. Flowers often without petals. Calyx white-edged. Stamens usually only two. 17. Narrow-leaved Pepper-cress.

Lower leaves not pinnatifid.

- *a.* Many seeds in each cell of the pod.
  - Plant glabrous and succulent. Leaves roundish, oval, heart-shaped or somewhat triangular, and more or less toothed. Upper ones sessile. Seed-pod globular. 19. *Scurvy-grass.
  - Plant hairy. Leaves heart-shaped and toothed. Seed-pods elliptical and flat. 25. Speedwell Draba.
- *b.* Only one seed in each cell of the pod.
  - Leaves linear-lanceolate, narrowed at the base.
    - Leaves entire, hoary with close-pressed silvery hairs. Plant one foot high, branched. Flowers fragrant. 27. Sweet Alysson.
    - Leaves serrated at the middle. Plant 2—3 feet high. 15. Broad-leaved Pepper-cress.
  - Upper leaves broadly-oblong, cordate at the base, amplexicaulent, and sessile. 16. Whitlow Pepper-cress.
  - Upper leaves sharply arrow-shaped at the base, and sessile. Plant hoary.
    - Style scarcely longer than the notch of the ovary. Stem branched only at the upper part. Plant annual. 13. Common Pepper-cress.
    - Style projecting considerably beyond the notch of the ovary. Stem branched at the base. Plant perennial. 14. Smith's Pepper-cress.

13. Seed-pods long and slender, not twisted, and *erect*, or nearly so. Upper leaves undivided, or merely cut or serrate, not pinnatifid. Plant *biennial* or *perennial*.
    - Leaves simply ciliated. Stems 3—4 inches high. 46. Ciliated Arabis.
    - Leaves hairy or downy upon the *surface*, or glabrous.
      - Upper stem-leaves auricled. Flowers and pods numerous. Stem very leafy. Petals always white, small. 47. Hairy Arabis.
      - None of the leaves auricled.
        - *a.* Petals *erect*, invariably white. Flowers few. Stem 3—6 inches high. 44. Bristol Arabis.
        - *b.* Petals *spreading*, usually purple. Plant *hoary* with fine pubescence. Seeds flat and winged.
          - All the leaves entire. Flowers very fragrant. 54. Wild Stock.
          - Lower leaves sinuate or toothed. Fragrant only at night. 55. Wave-leaved Stock.
        - *c.* Petals *spreading*. Plant hairy (or glabrous), but *not hoary*. Flowers usually purple.
          - Stem-leaves serrate. Plant 2—3 feet high. Flowers fragrant after sunset. 56. Dame's Rocket.
          - Stem-leaves entire. Stem 4—5 inches high. 45. Purple Alpine Arabis.

14. Seed-pods long, slender, and *erect*, or nearly so. Leaves as in 13, but the plant *annual.*
    - Plant glabrous. Stem 1—2 feet high. 51. HARE'S-EAR ERYSIMUM.
    - Plant more or less hairy.
        - Stem-leaves tapering at the base. Stem 2—12 inches high. 43. THALE-CRESS.
        - Stem-leaves arrow-shaped at the base. Stem 1—3 feet high, very erect and straight. 49. TOWER-MUSTARD.

15. Seed-pods long and slender, and *curved away from the stem*, which is simple, erect, 12 inches high. Leaves ovate and lanceolate, toothed, rather rough. Flowers with a yellowish tinge. 48. TOWER ARABIS.

SECTION III.

PETALS ABSENT.

Seed-pods roundish.	17. NARROW-LEAVED PEPPER-CRESS.
Seed-pods long and slender.	33. NARROW-LEAVED CARDAMINE.

HABITATS AND DISTRIBUTION.

1. PURPLE SEA-ROCKET—*Caki'le marit'ima.*

On the sea-shore, especially among the sand and smoothened pebbles just above high-water mark, common. Fl. June—October. Annual.

Curtis, iv. 628; E. B. iv. 231 (as *Bu'nias Caki'le*); Baxter, iv. 258.

The beautiful purple flowers are among the first to catch the eye when we quit the water-side and turn inshore. In fair seasons they last till November, and even to Christmas.

2. SEA-KALE—*Cram'be marit'ima.*

On the sea-shore, where sandy, or pebbly, and muddy, not rare. Coasts of Norfolk, plentiful. Fl. May, June.

E. B. xiii. 924; Baxter, ii. 107.

Commonly cultivated in kitchen-gardens.

3. COMMON WART-CRESS—*Coron'opus Ruell'ii.*

Waste ground and by waysides, especially in limestone districts, and near the sea, a common weed. Fl. June—Sept. Annual.

E. B. xxiv. 1660; Baxter, iv. 320.

4. CORNISH WART-CRESS—*Coron'opus did'yma.*

Waste ground, near the sea, in the south and south-west of England and in Ireland. Occasionally upon inland moors, the seeds brought by maritime birds. Fl. July. Annual.

E. B. iv. 248 (as *Lepid'ium did'ymum.*)

5. WOAD—*Isa'tis tincto'ria.*

In cultivated fields and upon their borders, rare and uncertain, probably now only as a descendant of former cultivation. Occasionally in stone-quarries. Durham. Fl. June, July. Biennial.

E. B. ii. 97; Baxter, iii. 210.

6. PENNY-CRESS—*Thlas'pi arven'se.*

Dry arable fields, and in waste dry ground, rare. Fl. June. Annual.

Curtis, ii. 407; E. B. xxiv. 1659.

The large, round, flat, semi-transparent pods, resembling silver pennies, render this, when in fruit, a very interesting and pretty plant.

7. PERFOLIATE THLASPI—*Thlas'pi perfolia'tum.*

Among the stone-pits about Burford, Oxfordshire, and near Cirencester and Upper Slaughter, Gloucestershire. Fl. April, May. Annual.

Curtis, iii. 508; E. B. xxxiii. 2354; Baxter, iii. 240.

8. MOUNTAIN THLASPI—*Thlas'pi alpes'tre.*

Mountainous pastures in the north of England, Wales, and Scotland, among limestone rocks and lead-mines, rare. Fl. June, July.

E. B. ii. 81.

9. SHEPHERDS'-PURSE—*Capsel'la Bursa-pasto'ris.*

Wherever upon dry land a plant can grow, vagrant and lawless as the dandelion. In gardens a constant and ineradicable weed, varying from three inches to two feet high, and beginning to blossom almost as soon as out of the ground. Fl. March—November. Annual.

Curtis, i. 50; E. B. xxi. 1485 (both as *Thlaspi Bursa-pastoris*); Baxter, iii. 191.

The triangular pods are unique among British Crucifers.

10. HUTCHIN'SIA—*Hutchin'sia petræ'a.*

Limestone rocks, rare. St. Vincent's Rocks, below the Observatory. Wales. Yorkshire. Fl. March, April. Annual.

Curtis, iii. 509; E. B. ii. 111 (as *Lepidium petræum*); Baxter, ii. 138.

11. BITTER CANDYTUFT—*Ibe'ris ama'ra.*

Chalky fields in Oxfordshire and Berkshire. Elsewhere as an escape from cultivation. Fl. June—September. Annual.

E. B. i. 52; Baxter, v. 351.

Common in gardens, where also are cultivated many exotic species, some with white flowers, others with purple. With the exception of the following plant they are distinguished from all other Cruciferæ by the lower petals being twice or thrice as long as the upper ones.

In gardens the sepals of the annual species often become petaloid, with a green stripe down the back, as in the Star-of-Bethlehem.

12. Teesdale's-cress—*Teesda'lia nudicau'lis.*

On sandy hedgebanks and in dry gravelly fields, rather uncommon. Fl. May, June. Annual.

Curtis. ii. 406; E. B. v. 327 (both as *Ibe'ris nudicau'lis*); Baxter, vi. 423.

13. Common Pepper-cress—*Lepid'ium campes'tre.*

Common in dry fields and by dry waysides. Fl. May—July, and again in September, among the stubble. Annual.

Curtis, ii. 337; E. B. xx. 1385 (both as *Thlas'pi campes'tre*).

14. Smith's Pepper-cress—*Lepid'ium Smith'ii.*

Dry fields, and by little-frequented waysides, not common. Fl. June, July.

E. B. xxvi. 1803 (as *Thlas'pi hir'tum.*)

15. Broad-leaved Pepper-cress—*Lepid'ium latifo'lium.*

Salt marshes, and in wet sandy situations near the sea, rare. Essex. Norfolk. Fl. July.

E. B. iii. 182; Baxter, iii. 236.

16. Whitlow Pepper-cress—*Lepid'ium Dra'ba.*

Naturalised in waste ground, and occasionally appearing in clover-fields, but with no well-established locality. Fl. June.

E. B. Supp. i. 2683.

17. Narrow-leaved Pepper-cress—*Lepid'ium rudera'le.*

Waste ground, near the sea, especially where the soil is calcareous. Coasts of Norfolk. South Wales. Cornwall. Abundant by the river Coln, below Colchester. Fl. June. Annual.

E. B. xxiii. 1595.

18. Horse-radish—*Cochlea'ria Armora'cia.*

Naturalised, from the refuse of gardens, in wet, waste ground, about orchards, and especially near rivers, and in their half-dried-up beds, common. Fl. May, June.

E. B. xxxiii. 2323.

19. Scurvy-grass—*Cochlea'ria officina'lis.*

On the sea-coast, both in wet and dry soil, preferring that which is occasionally washed by the salt-water, abundant in England and Ireland, still more so in Scotland. Often also upon the banks of tidal rivers, many miles inland, and, like the *Arme'ria marit'ima*, even upon the tops of mountains. Fl. May—July. Annual.

This interesting plant varies considerably in aspect, and many so-called "species" have in consequence been made out of it. The principal forms are called:—

Cochlea'ria officina'lis. (Curtis, iv. 629; E. B. viii. 551; Baxter, v. 375.)
——— *Ang'lica.* (E. B. viii. 552.)
——— *Da'nica.* (E. B. x. 696.)
——— *Grœnlan'dica.* (E. B. xxxiv. 2403.)

The last-named variety has the flowers tinged with purple.

20. SUBULARIA—*Subula'ria aquat'ica.*

On the margins of alpine lakes, where the soil is sandy or gravelly, and frequently at the bottom, quite under water. Scotland. North Wales. Ireland. Fl. July. Annual.

Curtis, iii. 510; E. B. xi. 732; Baxter, vi. 428.

21. COMMON WHITLOW-CRESS—*Dra'ba ver'na.*

Dry hedgebanks, and upon the tops of old walls, where earth has collected, common. Fl. March, April. Annual.

Curtis, i. 49; E. B. ix. 586; Baxter, i. 38.

One of those pretty little vegetable ephemera whose summer is over and gone while it is yet spring with everything else.

A variety with remarkably inflated seed-pods, is found upon Ben Lawers, above the lake.

22. YELLOW ROCK DRABA—*Dra'ba Aizoi'des.*

Upon rocks and old walls in the neighbourhood of Swansea. Principally upon Pennard Castle. Fl. March, April.

E. B. xviii. 1271.

Cultivated in curious gardens, chiefly as a rockery plant.

23. HIGHLAND DRABA—*Dra'ba rupes'tris.*

Rocks in the Highlands of Scotland. Ben Lawers. Fl. June, July.

E. B. xix. 1338 (as *Draba hirta.*)

24. HOARY DRABA—*Dra'ba inca'na.*

Alpine rocks, chiefly upon limestone. Summits of mountains in the north of England, Wales, and Scotland. Fl. June, July. Biennial.

E. B. vi. 388 (luxuriant from cultivation.)

25. SPEEDWELL DRABA—*Dra'ba mura'lis.*

Limestone mountains, and on walls built of limestone, rare and local. Yorkshire. Fl. May. Annual.

Curtis, iii. 511; E. B. xiii. 912.

26. CAMELINE—*Cameli'na sati'va.*

In ploughed fields, occasionally, and especially among flax, from imported seeds, but not propagating readily from seeds ripened in this country, and therefore casual and local. Occasionally with similar origin, as a weed in gardens. Fl. June, July. Annual.

Curtis, iii. 512; E. B. xviii. 1254 (as *Alyss'um sativum*); Baxter, vi. 447.

27. SWEET ALYSSON—*Ko'niga marit'ima.*

Naturalised upon banks and cliffs near the sea, in many places, but nowhere in England truly wild. Fl. July—Oct.

E. B. xxv. 1729 (as *Alyss'um marit'imum*); Baxter, v. 355; Bot. Mag. iii. 101 (as *Alyss'um halimifo'lium.*)

A variety with silver-edged leaves is a great favourite in gardens, especially for bordures and "ribbons."

28. LITTLE YELLOW ALYSSON—*Alyss'um calyci'num.*

Naturalised, or becoming so, in waste ground and dry fields, in many places, springing from accidentally imported seeds. Fl. summer. Annual.

E. B. Supp. iii. 2853.

29. CORAL-WORT—*Denta'ria bulbif'era.*

Woods, and in moist and shady places, nearly confined to the south-eastern counties. Middlesex. Surrey. Fl. April, May.

E. B. v. 309; Baxter, ii. 145.

The rhizome is white, fleshy, and toothed, bearing a resemblance to some kinds of coral, whence the name *coral*-wort.

30. COMMON BITTER-CRESS—*Cardami'ne præ'cox.*

In waste and cultivated ground, common everywhere. Fl. March—September. Annual.

Curtis, ii. 268; E. B. vii. 492 (both as *Cardami'ne hirsu'ta.*)

A luxuriant form, with the full complement of stamens, flowering later, and growing in wet shady places, especially in the clefts and crevices of mossy rocks by dropping water, has been distinguished as the *Cardami'ne sylvat'ica* or *Cardami'ne flexuo'sa.* This is the state of the plant figured in Curtis and E. B.

31. GREAT WHITE CARDAMINE—*Cardami'ne ama'ra.*

Marshy places, where somewhat shaded by trees, not common. Abundant near Manchester. Fl. April, May.

Curtis, i. 184; E. B. xiv. 1000.

The petals are traversed by fine pellucid veins, and are often tinged upon the outside with red or purple.

32. COMMON MEADOW CARDAMINE—*Cardami'ne praten'sis.*

In moist meadows, everywhere, especially where subject to inundation by rivers, loving alluvial richness of soil, and flowering in April and May, just after the sweet violets, and when the note of the cuckoo begins to "sound sweetly through the air."

Curtis, i. 185; E. B. xi. 776; Baxter, ii. 141.

Occasionally found double, and in this state commonly cultivated in gardens.

Like most favourite wild-flowers, it has many duplicate names, as "May-flower" and "cuckoo-flower." Obsoletely "lady-smock"—

> Soe have I seen a ladye-smock soe white,
> Blown in the mornynge, and mowed down at night.

The petals, as in the *amara*, are faintly veined with pale-lilac or semi-transparent lines. Small bulbs occasionally appear in the axils of some of the leaves, as happens regularly in the *Dentaria*, from which plant the present is then immediately distinguished by the difference in the foliage.

33. NARROW-LEAVED CARDAMINE—*Cardami'ne impa'tiens.*

Waste places, where rather shady and moist, preferring limestone. North of England. Derbyshire. Frome Glen, near Bristol, abundantly. Fl. May, June. Annual.

E. B. ii. 80.

The Cardamines are distinguished from all other plants of the family by the way in which the seed-pods open. As soon as ripe, the side pieces detach themselves at the lower extremity, roll up quick as lightning into a coil resembling a watch-spring, and shoot out the seeds in all directions. In the *Cardami'ne præ'cox* the movement is particularly remarkable. When invading a sylvan settlement of these little irritables in early summer, especially if the day be fine and warm, the vigour with which they discharge their tiny artillery about our ankles is quite facetious.

34. COMMON YELLOW-ROCKET—*Barbare'a vulga'ris.*

Frequent in moist meadows, and on the banks of rivers and streams. Fl. May—August.

E. B. vii. 443 (as *Erys'imum Barbare'a*); Baxter, vi. 450.

A double-flowered variety is common in cottage gardens, blossoming a long while, and the petals turning white as they fade.

35. EARLY YELLOW-ROCKET—*Barbare'a præ'cox.*

Watery places, like the former, but more frequent in ploughed fields, and by waysides near gardens; probably in most cases a deserter therefrom, being cultivated as a salad, under the name of American winter-cress. Fl. spring. Biennial.

E. B. xvi. 1129 (as *Erys'imum præ'cox.*)

The pods are thrice as long as in the common yellow-rocket, smooth, and exactly square, and the flowers smaller and paler; yet it is probably not a distinct species. *Barbare'a arcua'ta* or *Taurica*, and *B. stric'ta* or *Iber'ica* stand in about the same relation to the typical *B. vulga'ris*, under which name the whole of the forms are by some botanists included.

36. WATER-CRESS—*Nastur'tium officina'le.*

Brooks, clear springs, and pondsides, common. Fl. June, July.

Curtis, ii. 408; E. B. xii. 855 (both as *Sisym'brium Nastur'tium*); Baxter, iv. 271.

It is prudent for pedestrians and excursionists who purpose enjoying water-cresses on the spot where gathered, to take a little salt in their pockets. No plant can well be mistaken for water-cresses except a deleterious one of the Parsley-family, called marshwort; but in that the leaflets are serrated, and the two lowermost are the largest, whereas in the water-cress they are nearly entire, and the two lowermost are the smallest. Brooklime, a pungent plant, often found and gathered with water-cresses, and which may be eaten with safety, has simple and undivided leaves, growing in opposite pairs, and the flowers, in their season, of a brilliant azure. The water-cress is one of the few plants that are truly cosmopolite, being found wild in almost all parts of the world.

37. LAND YELLOW-CRESS—*Nastur'tium terres'tre.*

In waste gravelly places, especially where water has stood, and about the banks of clear watercourses, common. Fl. June—September. Annual.

Curtis, ii. 341; E. B. xxv. 1747 (both as *Sisym'brium terres'tre.*)

38. GREAT AMPHIBIOUS YELLOW-CRESS—*Nastur'tium amphib'ium.*

Pondsides, and banks of rivers and ditches, growing both in the water and upon the dry earth above, not uncommon. Fl. July, August.

E. B. xxvi. 1840 (as *Sisym'brium amphib'ium*).

The leaves of the submerged branches often become deeply pectinated, as happens with those of the water snow-cups, and with many other semi-amphibious plants where the structure of the leaves is favourable to it.

39. CREEPING YELLOW-CRESS—*Nastur'tium sylves'tre.*

Low watery places, and on the borders of ditches, rather rare. Fl. July, August.

Curtis, i. 186; E. B. xxxiii. 2324 (both as *Sisym'brium sylves'tre.*)

"*Nastur'tium an'ceps*," a variety differing from the normal state of the *sylvestre* in its stouter habit, in the lower leaves being lyrate, and the pods shorter in proportion to the pedicels, is said to be "common."

40. Common Hedge-mustard—*Sisym'brium officina'le.*

Roadsides, and on dry, parched hedgebanks, everywhere, loving drought and dust, which latter it seems to have a peculiar aptitude for collecting. Fl. June, July. Annual.

Curtis, ii. 342; E. B. xi. 735 (both as *Erys'imum officina'le.)*

A singular plant, readily distinguished by its pyramidal figure; long, rigid, outstretched, horizontal branches, leafless, and curving upwards at the extremities; little terminal clusters of minute flowers, and pods parallel with the stem, against which they are closely pressed.

41. Flix-weed—*Sisym'brium Sophi'a.*

Dry waste places, and upon rubbish heaps, common. Fl. summer. Annual.

E. B. xiv. 963.

The pods, when ripe, resemble little strings of beads, owing to the plenty and the roundness of the seeds within.

42. London Rocket—*Sisym'brium I'rio.*

Waste ground, and on dry banks and heaps of rubbish, rare. Chiefly about London and other large cities. Fl. July, August. Annual.

E. B. xxiii. 1631; Baxter ii. 146.

43. Thale-cress—*A'rabis Thalia'na.*

Dry hedgebanks and ploughed fields, common. Fl. April, May. Annual.

Curtis, i. 122; E. B. xiii. 901.

44. Bristol Arabis—*A'rabis stric'ta.*

St. Vincent's Rocks, near Bristol, chiefly below the sea-walls, abundant up to 1838; since then gathered too freely, and becoming scarce. Fl. March, April.

Curtis, iii. 513; E. B. ix. 614.

45. Purple Alpine Arabis—*A'rabis petræ'a.*

Lofty alpine rocks and upon the borders of mountain rivulets, in Wales and Scotland. Fl. June, July.

E. B. vii. 469 (as *Cardami'ne hastula'ta.)*

46. Ciliated Arabis—*A'rabis cilia'ta.*

Cliffs near the sea, very rare. Fl. July. Biennial.

E. B. xxv. 1746 (as *Turri'tis alpi'na.)*

47. Hairy Arabis—*A'rabis hirsu'ta.*

Rocks, especially upon limestone, stony banks, and upon walls, preferring a little shade, rather rare. Fl. May, June.

E. B. ix. 587 (as *Turri'tis hirsu'ta.)*

48. Tower Arabis—*A'rabis Turri'ta.*

Upon old walls in and about Cambridge and Oxford. Fl. May. Biennial.

Curtis, iv. 631; E. B. iii. 178; Baxter, ii. 159.

49. Tower-mustard—*Turri'tis gla'bra.*

On banks and by roadsides, where the soil is dry and gravelly, rare. Fl. May, June. Annual.

Curtis, ii. 267; E. B. xi. 777; Baxter, vi. 430.

50. Worm-seed—*Erys'imum Cheiranthoi'des.*

In corn and turnip-fields, moist waste ground, willow-beds, &c., not uncommon. Fl. July, August. Annual.

E. B. xiv. 942; Baxter, i. 62.

51. Hare's-ear Erysimum—*Erys'imum Orienta'le.*

In fields and upon cliffs near the sea, rare; chiefly in the south-eastern counties. Fl. June. Annual.

E. B. xxvi. 1804 (as *Brass'ica Orienta'lis.*)

52. Garlic White-cress—*Allia'ria officina'lis.*

Hedgebanks, shady lanes, and waste places, everywhere. Fl. May, June. Annual.

Curtis, i. 121; E. B. xii. 796 (both as *Erys'imum Allia'ria.*)

53. Wall-flower—*Cheiran'thus fruticulo'sus.*

Rocks and old walls, where the earth is dry and scanty; on the ground itself, where dry, as at Dover, upon the hill; emphatically upon noble ruins, abbeys, and dismantled castles. Conway Castle, abundant. Beeston Castle. St. Mary's Abbey, York. Fl. May—July. Biennial and perennial.

E.B. xxvii. 1934; Curt. iv. 630; Bax. iii. 237 (the two latter as *Cheiran'thus Chei'ri.*)

The wild form of the universally-favourite, old-fashioned, but never antiquated wall-flower of every garden. Under cultivation the petals become longer, and fluid, giving the raceme of flowers an elegantly *dègagée* appearance, quite different from that of the emblem of fidelity in misfortune. They also acquire a rich red-brown colour, becoming the proper *Cheiranthus Cheiri.* The garden form is very commonly double, and the original small yellow one occasionally so.

54. Wild Stock—*Matthi'ola inca'na.*

Cliffs by the seaside, on the southern coasts of England, rare, and doubtfully indigenous. Isle of Wight, especially about Niton. Fl. May, June.

E. B. xxvii. 1935 (as *Cheiran'thus inca'nus*); Baxter, vi. 445.

The wild state of the fragrant and weak-petaled Brompton stocks, or Gilliflowers, found in every garden, white, purple, and crimson, the latter, when double, more like carnations than crucifers. Usually biennial under cultivation.

55. Wave-leaved Stock—*Matthi'ola sinua'ta.*

On the sandy coasts of Wales and Cornwall, rare. Fl. May—August. Biennial.

E. B. vii. 462 (as *Cheiran'thus sinua'tus.*)

56. Dames' Rocket—*Hes'peris matrona'lis.*

Banks of small streams and rivulets, rare and probably not wild. Fl. May, June.

E. B. xi. 731 (as *Hesperis inodora*); Baxter, vi. 425.

Common in old-fashioned and cottage gardens, especially with double white flowers.

57. Wild Turnip—*Brass'ica campes'tris.*

Ploughed fields, especially upon their borders, waste places, and about the banks of rivers, &c., common. Fl. April—July. Annual and biennial.

Three forms of this plant are commonly distinguished—the Navew, or true *Brassica campestris*, (E. B. xxxii. 2234.) the rape or coleseed, *Brassica Na'pus*, (E. B. xxx. 2146.) and the Turnip, *Brassica Ra'pa* (E. B. xxxi. 2176; Baxter, vi. 458.) No characters can be found that justify their separation, the differences being only such as are induced by culture. All three are often confounded with Charlock, or *Sina'pis arven'sis*, from which they may be distinguished by the glabrous and glaucous upper leaves. The Rape and Turnip are biennial.

58. Wild Cabbage—*Brass'ica olera'cea.*

Cliffs and *débris* by the sea, in many places, but not very general. Walmer, Kent. Fl. May, June. Biennial.

E. B. ix. 637.

The origin of the numerous varieties of garden or cultivated cabbage, including Savoys, red-cabbage, cauliflowers, and broccoli. The large frothy heads of the two latter, so deservedly esteemed for the dinner-table, consist of incipient but undeveloped flower-stalks and flower-buds. Occasionally the principal stalks are considerably lengthened, while the buds remain in their abnormal condition.

59. Isle-of-Man Brassica—*Brass'ica Monen'sis.*

Sandy sea-coasts of the north of the Isle of Man, and sparingly upon the opposite sides of the Irish Channel. Also upon the west coasts of Scotland. Fl. June, July. Biennial.

Curtis, iv. 632; E. B. xiv. 962 (as *Sisym'brium Monen'se.*)

The Jersey Brassica, or *Brassica Cheiran'thus* (*Sinapis Cheiranthus* of E. B. Supp. ii. 2821.) is a variety of the *Monensis* with upright stems, hispid at the lower part. Channel Islands.

60. CHARLOCK—*Sina'pis arven'sis.*

Common among corn and other field crops, and in waste ground that has been newly disturbed, often a very troublesome weed. Fl. May, June. Annual.

Curtis, ii. 339; E. B. xxv. 1748.

The purple colour of the stalks about the joints is often a ready mark of this farmer's pest.

61. GROCERS' MUSTARD—*Sina'pis ni'gra.*

Occasionally in waste places, and by waysides, a runagate more or less recent, from neighbouring gardens. Fl. June, July. Annual.

E. B. xiv. 969; Baxter, v. 336.

The brown seeds supply the mustard of the cruet-stand.

62. SALAD MUSTARD—*Sina'pis al'ba.*

Waste and cultivated ground, and by waysides, not uncommon. Fl. June, July. Annual.

Curtis, ii. 338; E. B. xxiv. 1677.

The *yellow* seeds are sown in gardens, along with cress or *Lepidium sativum*, for early salads.

63. HOARY SINAPIS—*Sina'pis inca'na.*

Channel Islands. Sussex, probably introduced. Fl. July, August. Biennial.

E. B. Supp. iii. 2843 (as *Erucas'trum inca'num.*)

64. PERENNIAL WALL SINAPIS—*Sina'pis tenuifo'lia.*

Upon old walls and rubbish-heaps, especially near old towns, as Bristol and Chester, and there not uncommon. Dover, plentiful. Fl. July, August.

Curtis, i. 183 (as *Brassica mura'lis*); E. B. viii. 525 (as *Sisym'brium tenuifo'lium.*)

65. ANNUAL WALL SINAPIS—*Sina'pis mura'lis.*

In waste and sandy ground, principally near the sea, in the south of England. Very abundant in Kent and Surrey. Fl. August, Sept. Annual.

E. B. xvi. 1090 (as *Sisym'brium mura'le.*)

66. WILD RADISH—*Raph'anus Raphanis'trum.*

Among the crops on ploughed land, common, the lilac variety most usual, though lilac, white, and yellow sometimes mingle in the same field. Fl. June, July. Annual.

Curtis, ii. 266; E. B. xii. 856; Baxter, v. 359 (all three the yellow var.)

A maritime and biennial variety, sometimes distinguished as a species, under the name of *Raph'anus marit'imus* (E. B. xxiii. 1643.) occurs upon the coasts of Sussex, Ayrshire, &c., and plentifully in the Isle of Arran. It differs only in respect of its greater size, less veiny petals, and more abundantly serrated leaves, which are often formed of large and small lobes placed alternately.

From the normal form of the plant is derived the radish of the kitchen-garden, literally, *par excellence*, "the root," as presented by old Baucis to her unknown Olympian guests,—

> Intubaque, et radix, et lactis massa coacti.

The ornamental Cruciferæ grown in gardens are as numerous as the wild species. Earliest in the spring comes the white Arabis or mountain-snow, its hoary herbage forming dense round cushions, almost hidden by the flowers; then come the perennial white candy-tuft, *Ibe'ris sempervi'rens*, &c., the purple Alysson or *Aubrie'tia purpu'rea*, and the rock Alysson, again with hoary foliage and abundance of golden-yellow blossoms. These are soon followed by the virgin stock, or *Malco'mia marit'ima*, so pretty for edgings; ten-week stocks; the changeable stock, or *Cheiran'thus mutab'ilis*; the night-scented stock, or *Hes'peris tris'tis*; the *Biscutel'la*: the *Helioph'ila*; the deep orange-coloured *Erys'imum Peroffskia'num*; the *Schizopet'alon*, a deliciously fragrant little annual, with pinnatifid white petals, and many more, together with the garden forms of the indigenous species already mentioned. One of the most interesting is the old-fashioned "honesty," or *Luna'ria*, the beauty of which lies in the great oval silvery shields that form the partitions of its seed-pods, and which endure through the winter. They are often as large as florins, and in Cheshire are called "satin-leaves."

XIX. THE TROPHY-WORT FAMILY.—*Tropæola'ceæ.*

The principal representatives of this family, which is entirely American, are the well-known scrambling and shewy garden flowers commonly called "nasturtiums" and "Indian-cress," on account of the resemblance of their flavour to that of the water-cress, or *Nastur'tium officina'le*. They are characterised by their succulent stems, well clothed with leaves that are alternate, simple, lobed or undivided (peltate in the commonest), and with long petioles that are often bent into hooks, shaped like the letter S, and used as tendrils. The flowers are on long peduncles, red, scarlet, or yellow, sometimes with green superadded, and in a few cases wholly blue. Petals five, sometimes of different sizes, and two of them partially fimbriated. Calyx, in the true nasturtiums (while single), with a long hollow tail. Stamens 8—10. Ovary consisting of three carpels, which fall apart when ripe.

The common garden nasturtium is the *Tropæ'olum ma'jus*, the generic name referring to the shield-shaped leaves, presented full-front, and dark ensanguined flowers, which together so aptly image the blood-stained "trophy," helmets, armour, and weapons, of the ancient battle-field. The light and graceful Canary-bird plant, or *Tropæ'olum Canarien'se*, so pretty for a trellis, belongs to the same genus. This is sometimes called *Tropæ'olum peregri'num*. Among the prettiest of the green-house and half-hardy species, are *Tropæo'lum tricolo'rum* from Valparaiso, *Tropæ'olum tubero'sum*, (Bot. Mag. lxvi. 3714.) the blue-flowered *Tropæ'olum azu'reum*, (Bot. Reg. N. S. v. 65.) *Tropæ'olum pentaphyl'lum*, the brilliant *T. Moritzia'num* from Trinidad, (Bot. Mag. lxvii. 3844.) with all five petals deeply fimbriated, and the old-fashioned *T. minus*, chiefly with double flowers, and then without the accustomed tail. The extent to which most of the hardy kinds will spread in the course of the summer and autumn is really wonderful, and equally so the resistance of their leaves to wet. Rain has no power to moisten the surface, rolling off as fast as it falls, in silvery globules. This property comes of the cuticle being covered with microscopic papillæ, which entangle the air, and establish an air-plate over the entire breadth of the leaf, so that the water never really comes in contact with it. The reflection of light from the lower surface of the globule of water is a proof of this.

The *Limnan'thes Douglas'ii* (Bot. Mag. lxiv. 3554.) and three or four other species of the same genus, all pretty annuals with trailing stems and pinnatifid leaves, constitute a sub-family called *Limnanthoi'deæ.* They are characterised by their pentamerous and rosaceous flowers, with five stamens, a five-lobed ovary, and five stigmas. *Limnan'thes Douglas'ii* is yellow and white, *L. ro'sea* pink, *L. al'ba* wholly white. These curious plants have all the pungency of the true nasturtium, and help, even better than the Tropæolums, to establish the relationship of the family to the Malvaceæ on the one hand, and to the Geraniaceæ on the other. A ribbed calyx, and a pillar in the midst of the carpels, would connect them with the latter. From the mallows they are distinguished by the small number and the separateness of stamens.

XX. THE MIGNONETTE FAMILY.—*Reseda'ceæ.*

Herbaceous plants, with slender stems, sometimes half-procumbent; the leaves alternate, narrow-lanceolate, or pinnatifid, and while young, frequently crimped along the margins; the flowers small, yellowish or white, more or less irregular, usually very numerous, and borne in terminal racemes or spikes. Calyx of 4—6 narrow, spreading sepals; petals 3—6, usually unequal and mostly three to six-cleft; stamens about twelve, standing along with the petals on a large, glandular, and lateral plate; ovary solitary, three-lobed, one-celled, with three sessile stigmas, and opening at the top long before ripe,—a striking characteristic. Seeds numerous and kidney-shaped.

A little family confined to Europe and the borders of the Mediterranean, and made interesting by the fragrant species which gives name to it, botanically the *Rese'da odora'ta,* indigenous to the northern edge of Africa.

Three species grow wild in Britain.

1. Leaves narrow-lanceolate, three or four inches long. Spike of flowers 6—12 inches long, leafless, slender, erect, sometimes half-pendulous at the upper part. Stems erect and stiff, 2—3 feet high. WELD.
2. Leaves three-cleft, lower ones pinnatifid, with few lobes, which are often cut. Spike short and pyramidal. Petals usually six, greenish-yellow, one or two of them not cut. Calyx usually six-cleft. YELLOW RESEDA.
3. Leaves pinnatifid, the segments numerous, linear, and entire, though crimped at the margins. Petals usually five, white, all deeply cleft. Calyx usually five-cleft. SHRUBBY RESEDA.

HABITATS AND DISTRIBUTION.

1. WELD—*Rese'da Lute'ola.*

Dry waste ground, by roadsides, and upon hedgebanks, where the earth does not get much disturbed. Often also upon coalpit heaps, and on the banks of rivers, from stranded seeds, common. Fl. June—August. Biennial.

E. B. v. 320.

Possibly only a naturalised plant, having long been cultivated for the sake of its yellow dye.

2. YELLOW RESEDA—*Rese'da lu'tea.*

Dry waste places, chiefly upon limestone, and principally in the south-eastern counties. Fl. July, August. Annual and perennial.

E. B. v. 321; Baxter, i. 15.

3. SHRUBBY RESEDA—*Rese'da fruticulo'sa.*

A cultivated species, from the shores of the Mediterranean, not uncommon in gardens, and occasionally appearing in a half-wild state in the south-west of England. Also found in Ireland. Fl. July, August.

E. B. Supp. i. 2628.

Rese'da al'ba, also common in gardens, is a variety of this, with shorter pedicels, and more cylindrical racemes. "Tree-mignonette" is a perennial variety of the common *Rese'da odora'ta,* which plant is annual only when exposed to a northern climate without protection in winter.

XXI. THE VIOLET FAMILY.—*Viola'ceæ.*

Of this family there are two distinct sections, one almost confined to South America, shrubby in habit, and with regular flowers; the other comprising herbaceous plants, of northern temperate latitudes, with the flowers not regular. The latter, which alone concern us here, present the following characters:—Stems slender, three to twelve inches high, but often procumbent; leaves simple, petiolate, and stipuled; flowers solitary, on long peduncles, yellow, blue, purple, or white, or with a mixture of all these colours, and sometimes streaked; sepals five, generally enlarged backwards at the base; petals five, more or less unequal, the lower one with a protuberance, or sometimes a tail or "spur." Stamens five, their filaments very small, the anthers broad, short, obtuse, and partially connected by the edges, so as to come off like a cap from the roundish ovary which they overlie. Stigma oblique, pointed, or globular and concave. Capsule three-valved. Seeds numerous and shining. The mode of the escape of the seeds is very curious and interesting. The solar warmth causes the sides of the valves of the capsule to shrink and collapse; in doing this, they press heavily upon the polished and egg-shaped seeds, and jerk them out to a long distance, the valves falling back and remaining as three narrow and reflexed rays.

The exotic members of the family are in some cases medicinal in their roots, supplying a substitute for ipecacuanha; but the European species, though similar in properties, are of very slight importance.

Six species grow wild in Britain, or as some believe, only four, while the analysts run up the number to fifteen. The distinctive character being partly founded, in several cases, upon the stipules, it is important to observe that the leaves should be taken from the *middle* of the stem, those above and below it being variable.

A.

- Stipules very small, lanceolate, and pointed.
  - Sepals very narrow, lanceolate, and acuminate; flowers large, light-purple, scentless; stipules fringed. — 4. DOGS' VIOLET.
  - Sepals short, broad, and obtuse.
    - Plant with creeping runners; flowers fragrant, white or "violet." Leaves more or less downy. Bracts *above* the middle of the peduncles. — 1. SWEET VIOLET.
    - Plant usually without creeping runners. Flowers scentless.
      - Leaves and their petioles glabrous. Bracts *below* the middle of the peduncles. Flowers pale-blue. — 3. MARSH VIOLET.
      - Leaves and their petioles very hairy. — 2. HAIRY VIOLET.

B.

Stipules as large as the leaves, and divided; the terminal lobe large, broad and obtuse. Stigma almost globular, with an aperture at the summit.
  Stipules pinnatifid and lyrate; the terminal lobe crenate.
    Petals much larger than the calyx; flowers flat, three-coloured, shewy; capsule egg-shaped. 5. Wild Pansy.
    Petals not longer than the calyx; flowers concave, whitish, inconspicuous; capsule nearly globular. 5β. Hedge Pansy.
  Stipules five-cleft and palmate, the terminal lobe entire; flowers gay, usually bright-yellow. 6. Yellow Mountain Pansy.

HABITATS AND DISTRIBUTION.

1. Sweet Violet—*Vi'ola odora'ta.*

Upon warm and sheltered hedgebanks, and often at the foot of walls, upon the sunward side, among grass. Fl. March, April, and occasionally again in autumn.

Curtis, i. 63; E. B. ix. 619.

Common in gardens, and probably an escape from them when found near buildings, being often thrown out with weeds and surplus herbage, and readily taking root. In gardens frequently also with double flowers.

Surprise is often excited by the violet producing ripe capsules of seed, when to appearance no flowers have been left to originate them. The capsules come of a *second* crop of flowers, deficient in petals, and consequently unobserved. A similar phenomenon is observable in the Wood-sorrel and in the Touch-me-not, only that in the Touch-me-not it is the *first* flowers which are incomplete.

Vi'ola sua'vis differs from *V. odora'ta* only in wanting a slight hairiness upon the lateral petals. *Viola imber'bis* is the same plant.

2. Hairy Violet—*Vi'ola hir'ta.*

Warm hedgebanks, and in groves and thickets, where the soil is calcareous. Fl. April, May.

Curtis, i. 64; E. B. xiii. 894.

By some botanists considered a variety of the *odora'ta.*

3. Marsh Violet—*Vi'ola palus'tris.*

Wet and boggy places, especially where the soil is peaty, and occurring chiefly, though not exclusively, in the northern districts. Common near Manchester. Fl. May—July.

Curtis, i. 203; E. B. vii. 444.

4. Dogs' Violet—*Vi'ola cani'na.*

Everywhere on hedgebanks, and in the drier parts of woods, and on their sunny borders, following the *odora'ta;* a delightful ornament of the spring and early summer, and despite our predilections, a prettier flower than its favoured sister.

Curtis, i. 134; E. B. ix. 620; Baxter, i. 4.

The blossoms vary much in depth of hue, and are occasionally found white.

A pretty little variety, distinguished by the yellow colour of the spur, has been recorded under the name of *Viola flavicor'nis.* (E. B. Supp. ii. 2736.) Another state of the plant, with very pale flowers, sometimes nearly white, flowering branches more erect than in the usual form, and with leaves usually a good deal longer than broad, is distinguished by some botanists as the *Viola lac'tea.* (E. B. vii. 445.) Still further refining has detached *Viola stagni'na* and *Viola sylvat'ica.* Concerning these, see Babington's "Manual."

5. Wild Pansy—*Vi'ola tri'color.*

Everywhere in clover-fields, and on ploughed land generally. Frequent also upon the seaside sandhills, upon hedgebanks, and as a weed in gardens. Fl. April—October. Annual and perennial.

Curtis, i. 65; E. B, xviii. 1287.

The parent-form, seemingly, of the innumerable fancy varieties of the flower-garden, acknowledged a universal favourite by the medley of its names, "Love-in-idleness" (as old at least as the time of Shakspere), "Trinity Herb," and "Heart's-ease." The flowers turn towards the sun, and when many are open at once, as happens at the close of summer, present a droll appearance, looking like a number of faces, all on the *qui vive,* as when a crowd of people gazes curiously at a procession.

A wild form of this plant, with all the petals shorter than the calyx, the odd one yellow, and the others whitish, has by most authors been reckoned a species, under the name of *Vi'ola arven'sis.* (E. B. Supp. ii. 2712.) It occurs chiefly under hedges, and flowers throughout the spring and summer.

6. Yellow Mountain Pansy—*Vi'ola lu'tea.*

Moist pastures in the mountainous parts of the north of England, Wales, and Scotland, common. Rumbling Bridge, near Kinross, in great profusion. Fl. May—September.

E. B. xi. 721.

Some authors combine this also with the *tricolor*, and the technical differences, it must be confessed, are very slight. The two plants seem to be connected by the forms called *Viola Curtis'ii,* (E. B. Supp. ii. 2693.) the flowers of which are always yellow, and *Viola amæ'na,* in which they are wholly and always purple.

In gardens, the only important *Violas* besides the *tricolor*, are a pale blue-flowered species, with a remarkably long tail, called *calcara'ta*, or the "spurred," the *Viola palma'ta,* (Bot. Mag. xv. 535.) the *V. Canaden'sis,* the *V. cornu'ta,* (Bot. Mag. xxi. 791.) and the *V. peda'ta.* Occasionally we see the *Erpe'tion hedera'cea* and the *So'lea con'color*, and more rarely, in the hot-house, species of *Alsodei'a* from Madagascar, representing that portion of the family which has regular flowers, and recognised by their crested anthers.

XXII. THE STONE-CROP FAMILY.—*Crassula'ceæ.*

Herbaceous and evergreen plants, sometimes a little woody at the base. Leaves simple, scattered, rarely opposite, occasionally in whorls of three, sometimes in rosettes, often lumpy, swollen, and deformed, owing to their extreme succulence, whereby the skin is enormously distended. Flowers simple, regular, and pentamerous, presenting in many a most beautiful star-like figure, made more conspicuous by their vivid and decided colours, which are generally some shade of yellow or red, though white is not rare. The sepals and the petals are both apt to vary to as few as three, and to as many as seven, even in the same cluster of flowers; and in the genus *Sempervi'vum*, they are increased to twelve, and even to twenty-four. The stamens, which are normally ten, follow these fluctuations, ranging from three to above twenty, and the same is the case with the ovaries, which are invariably *free.* When ripe, the carpels open lengthways, disclosing numerous seeds in a double row. In *Rhodi'ola* the flowers are almost uniformly tetramerous, and the greater portion unisexual by incomplete development.

Sprinkled all over the world, the 300 known species of this family are remarkable for growing on sun-scorched rocks and naked walls, on roofs, and sandy plains, such as plants differently constituted could not endure for a day; and though many are rooted in the earth, it is not that they require the soil as a source of nutriment, but simply as anchorage. They take their food almost entirely through the pores of the leaves,—those delicate mouths, or "stomates," invisible to the naked eye, which serve in all plants as the principal avenues of sustenance, and which, as proved in the present instance, are competent to supersede the functions of the spongioles altogether. Nothing is more extraordinary in English Botany than to see the little *Sedum a'cre* sitting in golden epaulettes on the tops of mountain walls, exposed to the hottest rays of the noontide sun, and flourishing most where they come earliest and stay the longest. The red orpine will live for months, suspended by a string, without being once supplied with water. A branch of it will even grow freely after being placed between papers and pressed for the herbarium. *Bryophyl'lum calyci'num*, a curious plant from the Mauritius, and several species of the beautiful Mexican genus *Echeve'ria*, all of them tolerably frequent in good green-houses, are remarkable for producing buds upon the margins of their leaves, something after the manner of the development of young plants upon the fronds of certain ferns termed "viviparous." These buds are technically called "adventitious," the normal and customary point of the origin of buds being from the *axils* of the leaves, as stated in the Introduction (p. 22.) The evolution of them in considerable numbers, as happens in the leaves of the *Bryophyl'lum,* which often acquire a pinnate appearance, is of great interest in connection with the origin and structure of ovaries and ovules. The common house-leek is no less interesting and suggestive in the occasional development of imperfect ovules in the place of pollen.

Twelve species occur in Britain, some authors, by finer analysis, raising the number to sixteen. *Cotyle'don lu'tea,* said to have been found in Yorkshire and Somersetshire, and recorded in E. B. xxii. 1522, is not a native, nor even naturalised.

A.

Flowers in the axils of the leaves, sessile, usually solitary, and very minute. Plant reddish, seldom exceeding an inch in height. Leaves opposite. Sepals and petals 3—4. 12. TILLÆA.

B.

Flowers in an erect raceme of 3—12 inches in height, the stem sometimes branched at the base, and the branches bearing flowers. Corolla cylindrical, yellowish-green, pendulous. Root-leaves peltate, circular, or nearly so, with a dimple in the centre, thick and succulent, the lower ones on long petioles. Upper leaves irregularly notched. 11. NAVEL-WORT.

C.

Flowers in terminal cymes or corymbs.

1. Flowers invariably yellow, or greenish-yellow.

   Leaves flat, broad, an inch long, glaucous, crowded, sessile. Stems numerous, 6—10 inches high. Flowers unisexual by defect, the parts *in fours.* Root thick and solid, yielding, when cut, the odour of roses. 9. ROSE-ROOT.

   Leaves as thick, or nearly as thick, as they are broad, very numerous, minute, nearly erect, and much crowded. Stems 2—4 inches long and high, forming lax and wide-spreading, or densely-tufted cushions. Flowers bright golden-yellow. Plant acrid. 1. LITTLE GOLDEN STONECROP.

   Leaves slender and cylindrical, or oblong, usually many times longer than thick and broad.

   Flowering stems not exceeding four inches in height. Leaves generally in six rows, whorled and spreading. Plant tasteless. 2. SIX-ROWED STONECROP.

   Flowering-stems 6—12 inches high. Cymes large, two or three times branched, the branches recurved. Flowers numerous, handsome, often with the parts in sixes. Barren stems numerous, 2—3 inches long, and crowded with slender cylindrical leaves, which are often reflexed. 3. TALL ROCK SEDUM.

2. Flowers red, pinkish, or white (never yellow.)
   - *a.* Leaves broad, flat, or plano-convex, an inch or more in length.
     - *Leaves very thick and solid,* fringed, ending in sharp points, and collected in dense rosettes, which hang together by the cord-like branches, and form mounds of a yard or two in circumference. Flower-stems stout, 8—16 inches high. Branches of the cyme recurved. Flowers as large as a shilling, red, or rosy-purple, their parts in twelves or twenty-fours. 10. HOUSELEEK.
     - *Leaves thin, oblong, scattered,* coarsely serrated, and without a sharp point. Stems all erect, 12—24 inches high. Flowers not more than half an inch across, red or rosy-purple, in leafy cymes, which are chiefly terminal, but partly in the upper axils. Flowers mostly pentamerous. 8. RED ORPINE.
   - *b.* Leaves minute, not more than half an inch in length, usually less, oblong, or egg-shaped, generally solid, sometimes nearly globular.
     - *Leaves with a little spur at the base,* and often tinged with red. Stems 2—3 inches high, much branched, procumbent below. Flowers few in the cyme, but conspicuous from their white and starlike appearance and their purple anthers. Whole plant quite glabrous. 5. DWARF WHITE STONECROP.
     - *Leaves without spurs at the base.*
       - Plant perfectly glabrous, perennial; leaf-branches prostrate; flower-stems erect, 3—6 inches high. Flowers numerous, crowded, white, or tinged with rose-colour. 6. TALL WHITE STONECROP.
       - Flower-stalks more or less hairy and viscid, especially at the upper part.
         - Leaves almost globular. Stems procumbent. Branches 2—3 inches high. Flowers white, tinged with rose colour. *Perennial.* 4. THICK-LEAVED STONECROP.
         - Leaves oblong, flattened above, those upon the flowerless shoots almost exactly cylindrical, and all slightly hairy. Flowers few, dingy rose-colour. *Annual.* 7. HAIRY STONECROP.

HABITATS AND DISTRIBUTION.

1. LITTLE GOLDEN STONECROP—*Sédum ácre.*

Walls, rocks, and dry exposed places, where there is scarcely any earth, also upon the seaside sandhills, and upon thatched cottage-roofs, common. Fl. June, July.

Curtis, i. 32; E. B. xii. 839; Baxter, v. 364.

Common upon garden rockeries, and sometimes immolated in the open borders. The foliage is very acrid, whence the plant is often called "wall-pepper." The dry, empty, and bleached capsules resemble little pentamerous flowers.

2. **Six-rowed Stonecrop**—*Se'dum sexangula're.*

Old walls in the eastern parts of England, rare. Fl. July.

Curtis, ii. 253; E. B. xxviii. 1946.

3. **Tall Rock Sedum**—*Se'dum reflex'um.*

Tops of old walls, dry sandy banks, old cottage-roofs, and upon rocky slopes and cliffs that look to the south, especially upon limestone, common. Fl. June, July.

Four aspects of this very pretty and engaging plant have been reckoned as species, viz.:—

Se'dum reflex'um (the normal form). E. B. x. 695.
Se'dum glau'cum. E. B. xxxv. 2477.
Se'dum rupes'tre ("St. Vincent's Rocks Stonecrop"). E. B. iii. 170.
Se'dum Forsteria'num ("Welsh Stonecrop"). E. B. xxvi. 1802.

The three latter are only slight varieties. A fourth, much more curious, and common in gardens, has the stems united edgeways, and flattened, so as to compose plates several inches wide at the upper part, where the leaves form dense undulating fringes.

4. **Thick-leaved White Stonecrop**—*Se'dum dasyphyl'lum.*

Walls and rocks, chiefly in the limestone districts, rather rare. Clevedon. Conway. Edinburgh. Cork. Fl. June.

Curtis, i. 171; E. B. x. 656.

5. **Dwarf White Stonecrop**—*Se'dum Ang'licum.*

Sandy and rocky places, where dry and parched, especially near the sea, but not exclusively so. Abundant in North Wales, Scotland, the Hebrides, and Ireland. Ilfracombe. Fl. June, July. Annual.

E. B. iii. 171.

6. **Tall White Stonecrop**—*Se'dum al'bum.*

Walls, rocky places, and old cottage-roofs, especially of mouldering and mossy thatch, rather rare. Chiefly in the middle of England. Fl. July.

Curtis, i. 31; E. B. xxii. 1578.

7. **Hairy Stonecrop**—*Se'dum villo'sum.*

By the sides of mountain rills, and in other wet places, where the ground is rocky. Frequent in the north of England and in Scotland. Not found in Ireland. Fl. summer. Annual.

E. B. vi. 394.

8. **Red Orpine**—*Se'dum Tele'phium.*

Borders of dry fields, upon dry hedgebanks, and in waste dry ground among bushes, not very common. Fl. July—September.

Curtis, i. 170; E. B. xix. 1319.

Common in gardens, where the flowers occasionally vary to white. A form of this plant is distinguished by some botanists as *Se'dum purpu'reum.*

9. Rose-root—*Rhodi'ola ro'sea.*

Alpine rocks and cliffs, both inland and by the sea. Common in the north of England, the north of Ireland, and the north-west of Scotland. Fl. May, June.

E. B. viii. 508; Baxter, v. 391.

Frequent in gardens.

10. House-leek—*Sempervi'vum tecto'rum.*

Upon cottage-roofs and the ends of walls, common, but not truly wild. Fl. July, August.

Curtis, i. 174; E. B. xix. 1320; Baxter, vi. 401.

The rosette of the house-leek, and of several other species of this family, gives a very good idea of the nature of a scaly bulb, such as that of the lily. The bulb is a rosette of rudimentary leaves closely drawn together; the rosette of the house-leek is a bulb as it were spread open, and produced upon the surface of the ground instead of in the soil.

11. Navel-wort—*Cotyle'don Umbili'cus.*

Rocks, walls, ruins, dry banks, and similar habitats, chiefly in the limestone and the mountainous districts, common. Remarkably fine in the island of Arran. Fl. June—October.

Curtis, iv. 615; E. B. v. 325; Baxter, iv. 279.

A singular and very attractive plant, alike in its tall racemes of yellowish-green flowers, parallel with the wall, and in its thick, circular, and dimpled leaves, with the stalk in the centre, like that of the nasturtium. In some parts called "Penny-leaves" and "Penny-wort."

12. Tillæa—*Tillæ'a musco'sa.*

Moist and sandy heaths, forming reddish patches upon them, in various parts of England, but rather uncommon. Not found in Scotland. "In some parts of Norfolk and near London, a troublesome weed in garden walks." Fl. May—September. Annual.

E. B. ii. 116; Baxter, v. 380.

Many Crassulaceæ are grown for ornament. The Cobweb House-leek, or *Sempervi'vum arachnoi'deum* (Bot. Mag. ii. 68.) has rosettes like those of the *S. tecto'rum*, but smaller, and with white fibres crossing backwards and forwards from leaf to leaf, as if a spider had spun its web among them. In green-houses the splendid *Crass'ula* or *Kalosan'thes coccin'ea* (Bot. Mag. xiv. 495.) is the most beautiful and frequent representative of the family, though emulated by many *Se'dums*, *Sempervi'vums*, *Roche'as*, *Cotyle'dons*, and *Echeve'rias*, crimson, scarlet, and yellow. *Se'dum Siebold'ii*, which has trailing stems, and leaves in threes, is an excellent plant for suspended baskets, its glaucous hue rendering it highly ornamental.

XXIII. THE HEATH FAMILY.—*Erica'ceæ.*

This beautiful and favourite family consist of a few small trees, and a great number of generally evergreen shrubs, some as tall as a man, while others vary from two to three or four feet high, and are often remarkably tough and wiry in their stems and branches. In a few cases they are procumbent and almost herbaceous. No plants are more lavish of their corollas, nor do the members of any family excel the Ericaceæ in the unrelaxing flow of beauty which they maintain from earliest spring to the latest months of autumn. Few however, except the Clethras, are fragrant; and it is only now and then that we meet with the blossoms double, as happens in certain varieties of *Rhododen'dron* and *Aza'lea.* Some of the loveliest flowers cherished by gardeners stand in the front rank of the Ericaceæ, and three or four of the species contribute perhaps more than any other plants to the native decoration of our country. It is to the heaths we owe the purple glory of the autumnal hills.

Leaves simple, undivided, more or less oval or linear, often rigid and dry or leathery. Flowers usually regular, purple, lilac, crimson, yellow, or white, but never blue. Calyx and corolla sometimes of five pieces each, sometimes of four, the sepals and petals in either case more or less united at the edges, so as to render the flower tubular, companulate, or globular. Stamens free, eight, or five, or ten, according as the flower is tetramerous or pentamerous, the anthers often furnished with peculiar appendages, and the cells generally opening by pores at the extremity, as very plainly seen in the Rhododendron, when the flowers are a little overblown. Ovary single, free inside the corolla. Fruit usually a five-celled capsule, sometimes a berry. In the common purple Rhododendron the calyx is so minute as to seem absent.

The geographical distribution of the family is peculiar. Of the true heaths, 450 species belong to the Cape of Good Hope, while the few remaining ones are found principally in western Europe. In America there is not a single *Eri'ca,* though the common heather, or *Callu'na vulga'ris,* is met with in Newfoundland and near Boston. Both America and Europe contain abundance of the miscellaneous species. The family is met with also on the Himalayahs, and in Ceylon, where grow some of the most magnificent Rhododendrons in the world. Few species of the family are of economical value. Astringency marks a small number, and some, as the *Gaulthe'ria*, have eatable fruits. In a few cases they are deleterious. The common Andromeda is an acrid narcotic. The honey of the common yellow or sweet-scented Azalea, or *Aza'lea Pon'tica*, and likewise that of the Kalmias, is reputed poisonous.

Fourteen species grow wild in Britain.

A.

Calyx and corolla each four-parted. Stamens eight.

Leaves minute, disposed in four close and vertical rows up the branches, so as to conceal them while young. Flowers very numerous, shining rose-colour or lilac, sometimes white. Calyx much larger than the corolla, which it resembles in colour and texture, with an involucrum of four minute green bracts, resembling an outer calyx. Spikes of flowers slender, pointed, upright, and frequently unilateral.
1. COMMON HEATHER.

Leaves linear or ovate, and spreading.

1. Anthers protruding beyond the mouth of the corolla.

Corolla bell-shaped when it opens, afterwards almost globular. Sepals short and obtuse. Flowers light purple, rose-coloured, or white. Cluster leafy, tapering, and symmetrical.
5. CORNISH HEATH.

Corolla narrow egg-shaped. Sepals linear-lanceolate. Flowers red. Cluster not tapering. 4. CONNEMARA HEATH.

2. Anthers concealed inside the corolla.

a. Flowers in upright racemes.

Leaves nearly linear, green in all parts, glabrous, three in a whorl, and with tufts of young ones, upon short branches, in their axils. Flowers deep crimson; racemes leafy and irregular; the pedicels whorled. 2. CRIMSON HEATH.

Leaves ovate, 3—4 in a whorl, glaucous below, and fringed with hairs, which bear glands upon their points. Flowers half an inch long, bright and deep rose-colour, in terminal, interrupted, spike-like clusters. 6. CILIATED HEATH.

Leaves alternate, ovate, the margins revolute, white and downy on the under surface. Flowers few, large, drooping, purple, sometimes white. 7. MENZIESIA.

b. Flowers in dense, terminal, and capitate clusters, light rose-colour or white, wax-like, all inclining one way, and elegantly half-pendulous. Leaves four in a whorl, placed crossways upon the stem, and usually fringed with fine hairs. Upper branches springing several together from one point, and usually leafless and hairy for a little space below the head of flowers.
3. BLUSHING-MAIDEN HEATH.

c. Flowers in small umbels, the peduncles long and pink. Stems 6—12 inches high. Leaves alternate, lanceolate, the edges revolute, glaucous underneath. 13. ANDROMEDA (exceptionally).

B.

Calyx and corolla each five-parted or five-toothed. Stamens five or ten.

Tree, 6—30 feet high. Leaves elliptical-lanceolate, serrated, glossy. Flowers in little pendulous panicles, greenish-white, often tinged with pink. Fruit a bright red berry, the size of a cherry, covered with small tubercles, and hanging beautifully among the evergreen foliage, at Christmas. 12. STRAWBERRY-TREE.

Small shrubs or shrubby plants, not exceeding two feet in stature, and usually much less. Sometimes trailing.

1. Stamens *five*. Stems very woody, tortuous, and reclining. Leaves small, thyme-like, smooth, glossy, rigid, channelled, the margins remarkably revolute. Corolla flesh-coloured. 9. HIGHLAND AZALEA.

2. Stamens *ten*.

a. Stems procumbent, trailing to a distance of two or three feet from the root. Fruit a globular berry. Leaves obovate.

Leaves *entire*, shining, and resembling those of box. Flowers beautiful rose-colour, in small, crowded, terminal, and drooping racemes of 4—6. Berries *bright-red*, smooth, glossy, and mealy like those of holly. 10. RED BEARBERRY.

Leaves *serrated*, thin, and wrinkled. Flowers very pale rose-colour, almost white, 2—3 together. Berries *black*. 11. BLACK BEARBERRY.

b. Stems upright, branched. Fruit capsular. Leaves evergreen. Flowers in terminal clusters.

Flowers pink or pinky-white, upon peduncles an inch long and of the same colour. Leaves oblong-lanceolate, the margins revolute, glaucous underneath. Stems 6—12 inches high. Capsule roundish, with many seeds. 13. ANDROMEDA.

Flowers purplish-blue. Leaves linear, barely half an inch long, green on both surfaces. 8. PHYLLODOCE.

Leaves linear, covered upon the under surface with dense brown wool. Flowers white, in terminal corymbs. 14. LEDUM.

HABITATS AND DISTRIBUTION.

1. COMMON HEATHER—*Callu'na vulga'ris.*

Mountain-sides, heaths, moors, dry cloughs and scrubby dried-up places where less enduring plants cannot exist; loving also the steep banks of wooded ravines that lie faceward to the sun, abundant everywhere, flowering in autumn, and then purpling all great solitudes that have never felt the plough.

Curtis, ii. 322; E. B. xv. 1013 (both as *Eri'ca vulga'ris)* ; Bax'er, i. 76.

The young stems supply an excellent example of imbricated leaves, and might have furnished the patterns for some of the closely-woven gold chains used for watch-guards. Few flowers yield more honey; and since they are twentyfold more numerous in the same space than those of any other plant, the bees collect their harvest with rapidity.

Varieties occur commonly in gardens with white flowers and with deep-red flowers, together with a double variety of the common lilac. All three are found wild, but the double ones very rarely. A sixth variety has the stems covered with hoary down. The conspicuous part of the flower is the inner calyx.

2. Crimson Heath—*Eri'ca cine'rea.*

Dry moorlands and hilly wildernesses; in the green open spaces of dry woods, forming a knee-deep jungle, and fringing their uncertain paths; hanging also, in cataracts of crimson, from the crevices and ledges of sunward cliffs; abundant everywhere. Fl. July—Sept.

Curtis, i. 98; E. B. xv. 1015.

The flowers are so dry and juiceless that, even when fresh, they rustle as if withered. Like those of many other Ericaceæ, they remain attached to the stalks for a long time after they are dead, and may often be found upon the lower portion when the upper is covered with the blossoms of a new summer. They turn purple the day after they have been gathered, and retain this colour in the Herbarium indefinitely. A white variety is met with now and then.

3. Blushing-maiden Heath—*Eri'ca Tet'ralix.*

Wet heaths and moors, abundant. Very plentiful near Manchester. Fl. June—September.

Curtis, i. 21; E. B. xv. 1014; Baxter, vi. 418.

The blossoms seem a cluster of waxy berries rather than flowers. In the ordinary state, the part of the corolla next to the stem is of a lighter colour than that which is exposed, where it deepens to a delicate blush, sometimes amounting to a fine full crimson. They are sometimes found pure white. A very beautiful and well-marked variety, with shorter and broader leaves, of a deeper green, more numerous heads of smaller flowers, and growing in a more bushy manner, has been distinguished as *Eri'ca Macka'ii* or *Mackaia'na* (E. B. Supp. iii. 2900.) It occurs upon the moors at Connemara, in the west of Ireland, and is also found in Portugal.

4. Connemara Heath—*Eri'ca car'nea* (var *Hiber'nica.*)

The normal form of this plant is a native of the mountains of central Europe, and is known in gardens as the *Eri'ca car'nea* of Bot. Mag. i. 11. A variety called *Eri'ca Mediterra'nea* (E. B Supp. ii 2774, and Bot. Mag. xiv. 471.) is equally common in gardens, and apparently intermediate between these two stands the Connemara Heath, which grows wild in company with the *Eri'ca Macka'ii*, blossoming, like the other forms of the plant, in the spring.

5. Cornish Heath—*Eri'ca va'gans.*

Dry heaths in Cornwall. Abundant upon the southern promontory, and near the Lizard, upon the Goonhilly Downs, in the greatest profusion. Found also upon the coast of Waterford. Fl. August, Sept.

E. B. i. 3.

Common in gardens. In the deep-coloured varieties the anthers are dark-purple; in the white one they are red. While young, they form a ring just inside the corolla; afterwards they project considerably, owing to the elongation of their filaments.

6. Ciliated Heath—*Eri'ca cilia'ris.*

Boggy places in Cornwall; local, but, where found, abundant. Also near Corfe Castle, Dorsetshire. Fl. June, July.

E. B. Supp. i. 2618; Bot. Mag. xiv. 484.

Occasionally in gardens.

7. Menziesia—*Menzies'ia polifo'lia.*

Dry mountainous heaths in the west of Ireland. Connemara, very abundant. Fl. May—August.

E. B. i. 35 (as *Eri'ca Dabeo'ci*); Baxter, vi. 449.

Common in gardens, the flowers, as in the wild state, sometimes white.

8. Phyllodoce—*Phyllodo'ce cœru'lea.*

Upon the mountain called the Sow-of-Athol, Perthshire, growing among heath and crowberry, but said to be nearly extinct. No other British locality is known. Fl. June, July.

E. B. xxxv. 2469 (as *Menzies'ia cœru'lea.*)

9. Highland Azalea—*Loiseleur'ia procum'bens.*

"Dry moory ground, upon most of the Scottish highland mountains, among grass and moss; especially abundant in the north, and nowhere perhaps more plentiful than on the Cairngorum range, where it forms large dark-green patches." Fl. May, June.

E. B. xiii. 865; Baxter, vi. 463 (both as *Aza'lea procum'bens.*)

10. Red Bearberry—*Arctostaph'ylos Uva-ur'si.*

High and dry moorlands, especially where rough and grizzly with harsh undershrubs. Abundant in the north of England and Ireland, and particularly so in the Scotch Highlands and the Western Isles. Fl. May. Berries in August.

E. B. x. 714 (as *Ar'butus Uva-ur'si*); Baxter, vi. 502.

11. BLACK BEARBERRY—*Arctostaph'ylos alpi'na.*

Dry and heathy places upon the Scotch mountains, increasing in plenty towards the north. Fl. May.

E. B. xxix. 2030 (as *Ar'butus alpi'na.)*

12. STRAWBERRY-TREE—*Ar'butus Une'do.*

Abundant about the Lakes of Killarney, to the charms of which it contributes greatly; also near Bantry. On the rocky island of Innisfallen, growing like a forest-tree. Fl. September—December.

E. B. xxxiv. 2377; Baxter, vi. 497.

Planted in every good garden and shrubbery, but in the north very liable to be destroyed by frost. There is a variety with the flowers double.

13. ANDROMEDA—*Androm'eda polifo'lia.*

In company with the heaths, sundews, and silver-tassels, upon every wet moor in Cheshire and Lancashire. Lowlands of Scotland. Ireland. Fl. April—June, and often again in September.

E. B. x. 713 (peduncles wrong); Baxter, v. 361.

Occasionally in gardens, and both there, and in the wild state, sometimes white. The figure in E. B. is quite wrong as to the inflorescence, though it may represent an occasional variety.

14. LEDUM—*Le'dum palus'tre.*

"Upon the wild islands at Achill-head, north-west coast of Ireland, with the *Papa'ver nudicau'le.* Fl. early summer." (The original statement respecting these plants appears to have been made in mistake.)

Curtis, iv. 608; Baxter, vi. 508.

Common in gardens.

So many delicious flowers and handsome shrubs of this family adorn our gardens, that it is difficult to particularise. Rhododendrons of all kinds, Azaleas, Kalmias, *Androm'edas, Pernet'tyas,* the *Gaulthe'ria,* the *Epigæ'a,* and the elegant *Cleth'ras,* all belong to its ranks. Most of these are common, and the two first-named universal. Some Azaleas resemble honeysuckles in the form of their flowers, and are often called by the same name. The corollas of these, when a little overblown, are apt to detach themselves at the base, and, slipping down the pistil, hang from the globular stigma like fuchsias, the styles serving as imitative peduncles. Others, grown largely for exhibition, are of colours so fervid that we almost feel the glow of fire upon our cheeks as we approach them; the leaves of others again, in autumn, turn deep crimson. The Kalmias are known by the exquisite cup-form of their delicate pink or white corollas, in many kinds quite as large as the bowl of the acorn, with niches for the stamens, in which they lie recurved like the ribs of an opened parasol, till the anthers are ready to burst, when they spring up in succession, and spirt their pollen upon the stigma. The hardy Ericas, with their needle-form foliage, and plentiful rosy or white bells, are among the earliest harbingers of spring, and re-appear with the asters and dahlias of September. The green-house Ericas are perhaps the loveliest plants in cultivation. Every shade of pink, red, crimson, and green, with the purest pearly white, and occasionally yellow, is met with in their different species; while in form their corollas exhibit every possible modification of the flask, the tube, and the vase. Many are round as an air-bubble. The surface is in some as smooth as the finest porcelain, in others hairy, silky, or glutinous; and the foliage in every instance needle-form, plentiful, and evergreen. *Eri'ca odora'ta* (Bot. Mag. xxxiv. 1399.) is remarkable for its fragrant flowers; and *Eri'ca monadel'pha*, (Bot. Mag. xxxiii. 1370.) for the cohesion of the filaments of the stamens, which form a tube like that of the *Melia*, the upper extremity and the coronet of anthers protruding some distance beyond the mouth of the corolla. Among other very charming plants of this family may be mentioned the Chinese *Enkian'thus*, (Bot. Mag. xl. 1649.) the *Leucothöe pul'chra* of the Caraccas, and the *Beja'ria Lindenia'na* from N. W. Peru.

XXIV. THE EPACRIS FAMILY.—*Epacrida'ceæ.*

Evergreen shrubs, similar externally to Ericas, but differing from them in several important particulars. The anthers, instead of having two cells, with terminal apertures, in the Epacrids have only one cell, which opens longitudinally; the filaments of the stamens often adhere for their whole length to the inner surface of the united petals; and the corolla, instead of being four-cleft, as in Ericas, is conspicuously pentamerous. The Epacridaceæ are also more rigid in their long and leafy branches, and remarkable among Exogens for the parallel though scarcely distinguishable veins of their leaves, which are likewise, for the most part, very rigid, and sometimes almost prickly at the points.

Over 300 species of this truly beautiful family have been determined, all natives of the Indian Archipelago, Australia, or Polynesia, where they abound as Ericas do at the Cape of Good Hope. In our green-houses they almost rival the heaths, throwing up numerous erect and leafy stems, 2—4 feet high, and hung with innumerable little tubes or globular bells, which are usually pink or white. None surpass the old *Epac'ris grandiflo'ra*, the first that was introduced, now sixty years ago. The branches of this lovely plant are prone to spread horizontally, the crimson blossoms, white at the tips, hanging from them close and straight as the teeth of a comb, and forming an exquisite fringe an inch or more in depth. In addition to the many species of true *Epac'ris*, there are representatives, in good collections, of *Lysine'ma*, *Sprenge'lia*, *Leucopo'gon*, *Dracophyll'um*, *Anderso'nia*, *Stenanthe'ra*, *Styphe'lia*, *Trochocar'pa* (yellow-flowered), *Sphenot'oma* and various others.

XXV. THE PYROLA FAMILY.—*Pyrola'ceæ.*

Very pretty little herbaceous perennials, usually with oval or circular leaves, which are mostly radical, petiolate, and about an inch in diameter; and upright racemes of half-pendulous, whitish, and often fragrant flowers. Stem solitary, 6—8 inches high. Petals five, concave and usually converging, so as to form a bell-shaped corolla. Stamens ten, the anthers opening by terminal pores, like those of heaths. Ovary single; style often curved, and protruding beyond the corolla. Capsule five-angled, and bursting vertically; seeds numerous, with elongated membranous tunics, and resembling, when magnified, those of the orchis.

The racemose inflorescence is not universal. *Py'rola uniflo'ra* is distinguished by the character expressed in its name, and the same is the case with the beautiful *Chimaph'ila corymbo'sa*, or *Py'rola umbella'ta.* (Bot. Mag. xx. 778.) This exquisite plant has the centre of every blossom suffused with deep rose-colour.

About twenty species are known, all natives of northern temperate latitudes. Five grow wild in Britain.

A. Flower solitary, terminal, white or pale pink, nearly an inch across, and fragrant. 1. Snowdrop Pyrola.
B. Flowers in upright racemes.
  1. Flowers all turned one way, pale greenish-white. Style long, straight, and protruding. 2. Northern Pyrola.
  2. Flowers turned in various directions.
    Style short and straight, and enclosed in the corolla, or nearly so. Petals white or pale pink. 3. Common Pyrola.
    Style protruding considerably beyond the corolla.
      Stamens (in most cases) all turned upwards. Style bent down. Corolla pure white. Fragrant. 5. Round-leaved Pyrola.
      Stamens incurved around the ovary. Style straight. Corolla white with a pink edge, or yellowish-white. 4. Intermediate Pyrola.

HABITATS AND DISTRIBUTION.

1. Snowdrop Pyrola—*Py'rola uniflo'ra.*

Alpine woods, on the margins of little rills, its roots running deep among the moss. Found only in Scotland, and there very seldom. Fl. July.

Curtis, iv. 611; E. B. iii. 146.

2. Northern Pyrola—*Py'rola secun'da.*

Mossy alpine woods, especially of birch and fir; chiefly in the Highlands of Scotland. Fl. July, August.

Curtis, iv. 610; E. B. viii. 517.

3. COMMON PYROLA—*Py'rola mi'nor.*

Mossy woods; chiefly in the mountainous districts. Shropshire. Brizlee Hill, near Alnwick. Common in the Scotch Highlands and in the Hebrides. Fl. June, July.

Curtis, iv. 609; E. B. iii. 158 (not good); Baxter, iii. 239.

A variety of this has been named *Py'rola ro'sea*, (E. B. xxxvi. 2543.) the figure representing the species excellently.

4. INTERMEDIATE PYROLA—*Py'rola me'dia.*

Woods in the north of England; rare. Common in Scotland. In Ireland rare. Fl. July, August.

Curtis, iii. 489; E. B. xxviii. 1945.

By some thought to be only a variety of the *minor*.

5. ROUND-LEAVED PYROLA—*Py'rola rotundifo'lia.*

Heathy woods, and occasionally upon exposed commons; rather rare. Abundant in the little natural gardens among the sandhills below Southport, Lancashire, growing in white forests, conspicuous a long way off; still more so near the embouchure of the Ribble, at the northern angle. In Guernsey "among tall reeds by the sea." Fl. July, August.

Curtis, iii. 488; E. B. iii. 213.

The corolla is much more expanded than in the former species, allowing a full view of the large and beautiful tawny-yellow anthers, which usually stand, while young, as an aureola to the ovary, or as if clustered on its upper side.

XXVI. THE STERCULIA FAMILY.—*Sterculia'ceæ.*

Large trees and shrubs, intimately related to the *Malvaceæ*, and natives exclusively of warm countries. The species, which number about 130, include some of the most extraordinary productions of nature, such as the famous *Adanso'nia* or Baobab, of Senegal, (Bot. Mag. lv. 2791.) and the Mexican hand-flower or *Cheiroste'mon*, (Bot. Mag. lxxxv. 5135.) which opened its singular blossoms in England in 1859, and again in 1862. The likeness, however, is less to a hand than to a *claw*. The flowers of the genus *Bombax* are among the largest known to botany, measuring in some cases, 18 inches across. *Bombax insig'ne* is figured in Wallich's "Plantæ Asiaticæ Rariores," vol. i. pl. 79 and 80. *Bombax pentan'drum*, now called *Erioden'dron anfractuo'sum*, is the celebrated "Silk-cotton tree." *Stercu'lia platanifo'lia* is a rare half-hardy tree, from China, with fine palmate leaves, smooth on both sides, and small greenish-yellow flowers.

XXVII. THE MONOTROPA FAMILY.—*Monotropa'ceæ.*

A little family of herbaceous *parasites*, that is to say, plants that fix themselves, either when they vegetate from the seed, or very soon afterwards, upon the stems, branches, or roots of other plants of a different kind, feeding upon the juices of their victims, instead of procuring nourishment direct from the earth and atmosphere. There are several different families of these vegetable thieves, mostly agreeing, as to their flowers and fruit, with families of high development, but generally destitute of leaves, or at all events of *green* leaves, though usually provided with scales that represent those organs. The leafless parasites are usually and in every part of a dingy cadaverous white or brownish colour, passing into purple or yellowish, their stems rising to the height of 6—18 inches, and attached at the base to the roots of trees and shrubs. Such is the case with the present family, the affinities of which are in other respects with the Pyrolas. Some botanists do not hesitate to unite it to the Pyrolaceæ, and some place both the Monotropas and the Pyrolaceæ in the Heath-family, but the very dissimilar habit of growth is sufficient reason for keeping them separate, at all events as regards the Ericaceæ. Affinities and differences, both in botany and zoology, do not consist simply in points of structure, but in the resemblances or otherwise of the entire nature and economy of the objects under consideration. In especial reference to this, it is proper to add that the parasitism of the Monotropas is by some authors considered not proven, and that by others it is absolutely denied.

One species is indigenous to Britain, a plant of a yellowish hue, with the odour of primroses or bean-blossom, and consisting of an erect and unbranched stem, 6—8 inches high, clothed with oblong or ovate scales, and terminating in a short, half-pendulous raceme of 6—8 flowers, which as the seeds ripen, becomes erect. The lateral flowers have their parts in *fours;* the terminal ones have them in *fives;* the stamens being 8—10.

HABITATS AND DISTRIBUTION.

MONOTROPA—*Monot'ropa Hypo'pitys.*

About the roots of beech and fir-trees, in woods; occasionally in open heathy places; rare. Sandhills at Southport, Lancashire, upon the creeping willow. Fl. July.

Curtis, iii. 487; E. B. i. 69; Baxter, iv. 275.

XXVIII. THE PASSION-FLOWER FAMILY.—*Passiflora'ceæ.*

Plants with slender, half-shrubby stems, climbing many yards high, like the vine, by means of powerful axillary tendrils. Leaves alternate, fan-veined, generally with five or seven deep lobes, corresponding to the principal veins, and with stipules of considerable size and beauty. Sometimes, as in the *Passiflo'ra ala'ta*, (Bot. Mag. i. 66.) the leaves are oval and undivided; and in the very curious *Passiflo'ra vespertilio'nis* only the two lowermost lobes are developed, giving the leaf the figure of a flying bat. The flowers are simple, regular, pentamerous, usually 2—3 inches across, star-like, and of a fine crimson, blue, or purple; the five stamens, and the ovary, with its three knobbed stigmas, elevated upon a pillar called a "thecaphore," almost peculiar to the family, and furnishing a ready means of recognition. The stigmas often spread horizontally, contrasting very elegantly with the five great versatile anthers. Passion-flowers are also known immediately by the beautiful and peculiar coronet of coloured rays intermediate between the petals and the thecaphore, and which, in combination with the former, gives to these lustrous flowers the look of blended star-fishes and sea-anemones. In the *Passiflo'ra ala'ta*, the rays of which are white and

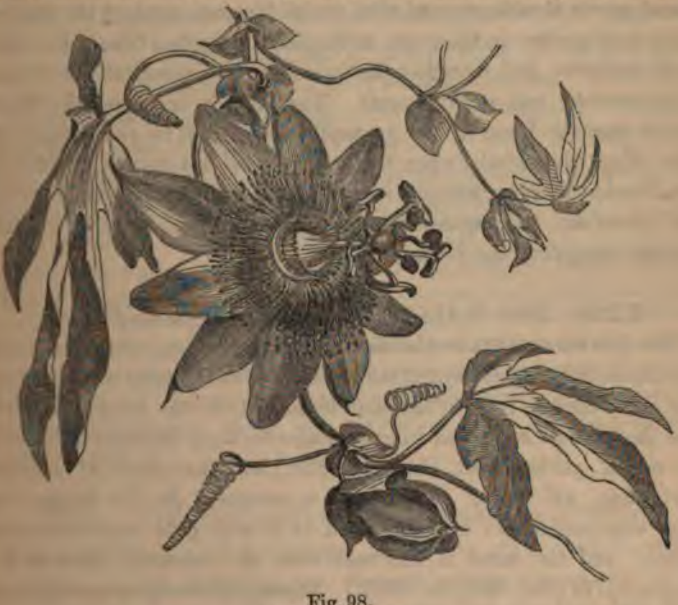

Fig. 98.
Passion-flower.

purple in alternate bars, like the quills of a porcupine, we seem to behold a captive *Actin'ia gemma'cea.* The length of the thecaphore varies considerably in different species. It is longest perhaps in the *Passiflo'ra kermesi'na* (Bot. Mag. lxiii. 3503.)

The pride of South America and the West Indies, festooning every tree, and swaying by their tendrils in long pendants, Passion-flowers are to the forests of those favoured countries what honeysuckle and bryony are to the hedgerows and woods of England. Elsewhere there are but few, and scarcely any beyond the tropics; and consequently, with the exception of the common blue Passion-flower, or *Passiflo'ra cœru'lea,* their splendours are exclusively for the hot-house. The last-named grows abundantly and with lavish blossoms against the walls of every good garden in the south of England, and often frames the basement windows, and wreathes the balconies and verandahs, of houses in aristocratic and sunny streets. The large yellow egg-like fruits, which resemble those of the granadilla or *Passiflo'ra quadrangula'ris,* (Bot. Mag. xlvi. 2041.) ripen freely. In good hot-houses, besides the true Passion-flowers, there are examples of the splendid genera *Tacso'nia* and *Disem'ma*, and occasionally the beautiful white-flowered *Smeathman'nia lœviga'ta* from Sierra Leone.

XXIX. THE MALPIGHIA FAMILY.—*Malpighia'ceæ.*

The great mass of this splendid family is Brazilian, and scarcely any species are indigenous beyond the frontiers of the tropical zone. Hence, like many others, it is in England found only in the hot-house. The true *Malpigh'ias* are noted in most cases for their brilliant flowers, as the red *M. gla'bra,* (Bot. Mag. xxi. 813.) and the yellow *M. volu'bilis* (Bot. Mag. xxi. 809.) *Baniste'ria* is esteemed for its foliage, the large elliptical leaves being covered as if with gold upon the under surface, and the same is the case with the beautiful *Heterop'teris chrysophyl'la* (Bot. Mag. lx. 3237.) *Stigmaphyl'lons* produce their fine yellow flowers in umbels of 3—5. *Hiræ'as* are pretty climbers.

Ordinarily these fine plants may be identified with ease. The leaves are opposite and entire, glandular upon the petiole or the under surface, and not infrequently with long stiff hairs, singularly attached by the middle, so as to lie flat upon the surface. The flowers are pentamerous, with conspicuous glands at the base of the calyx, and the petals have long and slender stalks, by means of which they hang in a remarkably graceful manner from between the sepals. The stamens are usually ten, and often have the filaments united.

XXX. THE TAMARISK FAMILY.—*Tamarica'ceæ.*

A little family of shrubs and herbs, usually growing by the sea-side, though sometimes by the edges of rivers and torrents, and having its maximum, both of species and individuals, on the borders of the Mediterranean. The common Tamarisk extends to England. This is a slender shrub, usually three to five or six feet high, with numerous twiggy and flexible branches, erect, or slightly pendulous at the extremities, and covered with minute, green, scaly, and pointed leaves, pressed close to the stem, the general *ensemble* of the plant being elegantly light and feathery. The flowers are small, pink or white, pentamerous, crowded into numerous spikes an inch or two long, and followed by little capsules of abundant feathery seeds.

HABITATS AND DISTRIBUTION.

COMMON TAMARISK—*Tam'arix Gal'lica.*

Rocky banks and cliffs upon the south coast of England. Plentiful about St. Michael's Mount and the Lizard. At Looe, in Cornwall, it is the wild plant of every farmer's hedge, flourishing in company with the myrtle, close to the sea-shore. Fl. all summer.

E. B. xix. 1318; Baxter, vi. 481.

This beautiful plant will, in favourable situations, attain the height of 30 feet. It is invaluable for gardens by the sea, as well known to every one who has visited Brighton, and flourishes even far inland, blooming for several months together. Theocritus and other ancient poets celebrate it incessantly under the name of *Myrica.* The *Tam'arix German'ica*, or, as it is now called, *Myrica'ria German'ica*, is distinguished by its close, upright habit of growth; longer, thicker, and more widely separated leaves; flowers with ten stamens; and connate, instead of divaricate, stigmas.

XXXI. THE CUSTARD-APPLE FAMILY.—*Anona'ceæ.*

Trees and shrubs of the tropics, related in their most important characters to the Magnoliaceæ. Several species are celebrated for their delicious fruits,—the "custard-apples" of the East and West Indies,—and there are few that are not aromatic in every part. In Britain, they are of course represented only in a few that thrive under curious cultivation. One species is half-hardy, the rare *Uva'ria* or *Asimi'na trilo'ba*, a small Chinese tree, densely clothed with long acuminate leaves that lie one over another in such a manner as to give a peculiar imbricated appearance to the whole plant. The flowers, which are purplish, campanulate, trimerous, sessile, and drooping, appear before the leaves come out.

XXXII. THE MAPLE FAMILY.—*Acera'ceæ.*

A small family of trees, corresponding to the Linnæan genus *Acer*, and confined to the northern hemisphere. They are in every case ornamental, and are noted, in several instances, for their sugary sap, and their light and useful timber. The beautifully mottled woods called "bird's-eye maple" and "curly maple," are well-known in drawing-rooms; "maple sugar" is familiar to everyone acquainted with the productions of New Brunswick. Leaves opposite, usually simple and fan-lobed, in a few cases oval and undivided, in others *quasi*-pinnate, always with long petioles, and mostly deciduous. Flowers small, usually green, or greenish-yellow, collected plentifully in axillary racemes or corymbs, and formed of five sepals, five petals, and 5—12, but usually eight stamens, the latter rising from a thick and flattened ring beneath the ovary, which is two-lobed, and compressed laterally. The stigmas are at first nearly sessile, but subsequently the style elongates, (though not in every flower), and converts them into a couple of elegant volutes, like those of the Compositæ, or the Greek letter Y. The lobes of the ovary, when ripe, become roundish and one-seeded carpels, adhering by their inner edges, and lengthened at the extremities into thin dry wings, which are often beautifully veined, and, while young, often rose-colour. In some species the wings spread horizontally; in others they are curved, and resemble a earwig's opened pincers. There are often as many as three carpels, composing a little tripod, and occasionally four, and even five. The flowers are often

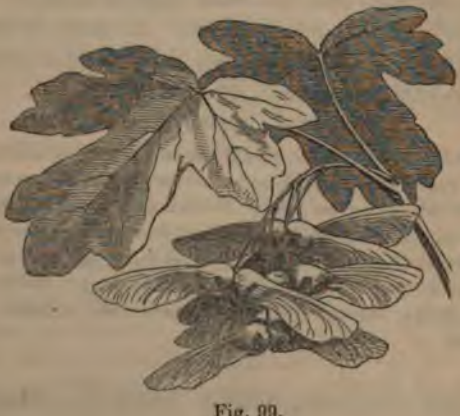

Fig. 99.
Maple.

unisexual by defect, perfect and imperfect ones mingling in the same cluster.

Two species occur commonly in England,—one truly wild, the other brought originally from the mountains of central Europe and western Asia, but now nearly naturalised.

1. Flowers in long, pendulous, and slightly-compound racemes. Leaves fan-lobed, 4—5 inches in width, the lobes pointed and serrate. Fruit glabrous or nearly so, the wings curved and converging. SYCAMORE.
2. Flowers in erect corymbs. Leaves 1½—2 inches across, the lobes obtuse and entire, or slightly crenate. Fruit downy; the wings horizontal. Bark furrowed and corky (Fig. 99.) COMMON MAPLE.

HABITATS AND DISTRIBUTION.

1. SYCAMORE—*A'cer pseu'do-plat'anus.*

Everywhere in plantations, parks, and hedges. Fl. May, June.

E. B. v. 303.

This noble tree, which attains the age of 100 to 200 years or more, has been cultivated in Britain since the thirteenth century. It is commonly confounded with the Plane, but is immediately distinguished by the leaves being *opposite*, those of the plane being *alternate*. While quite young, they are of a fine brownish-red, giving some idea of the spring-phenomena of Ceylon, as described by Sir Emerson Tennent. The foliage is developed early, and with great rapidity; the racemes of pale-green flowers come out copiously at the same moment, and make the tree appear mature before we are aware, the sycamore being one of those fine-spirited plants that, like the horse-chesnut, love to begin life with *éclât*. During summer, the leaves are apt to be covered with minute drops of extravasated sap, called "honey-dew;" and in autumn they are often marked with large, black, circular spots, caused by a parasitic fungus, the *Xyloma Acerinum*. A variety, common in shrubberies, has the foliage quaintly variegated with whitish green of two or three different shades. If the newly-ripe carpels be cut open, the cotyledons will be found doubled up and ready to expand; when the seeds germinate in spring, the little green thongs unfold to the length of an inch and a half, one of them being often deeply cloven, and where sycamores are plentiful, may be found in hundreds on every hedgebank.

2. COMMON MAPLE—*A'cer campes'tre.*

Woods and plantations; common. Still more so as a scraggy bush in hedges. Not indigenous in Ireland, and probably not wild in Scotland. Fl. May, June.

E. B. v. 304; Baxter, ii. 98.

The young leaves and the twigs are often red, and in autumn the whole mass of the foliage changes to a clear deep yellow. The leaves are frequently beset with red warts the size of pin-heads, occasioned by the puncture of some insect, and serving as a nidus for its young. When without leaves, the maple may be known by its corky and rugged bark, full of deep cracks. There is a variety with the leaves parti-coloured.

Nearly thirty different species of North American maples have been introduced into English gardens, the chief being the sugar-maple or *A'cer sacchari'num*. The Tartarian maple, or *A'cer Tatar'icum*, is valued for its very early foliage; the Norway maple, or *A'cer Platanoi'des*, attains the height of 60—70 feet; *A'cer rubrum* is remarkable for its red flowers; *A'cer eriocar'pum*, for the white under-surface of its leaves. One of the most beautiful of the family is the Negundo, or *Negun'dium fraxinifo'lium*. The leaves consist of 3—5 *quasi*-leaflets, the opposite ones coarsely and sparingly toothed, and the odd one oftener three-lobed than undivided. The foliage is of a fine yellowish-green, and moves with the slightest breath of wind.

XXXIII. THE MILKWORT FAMILY.—*Polygala'ceæ.*

Under-shrubby or herbaceous plants, with leaves for the most part simple, lanceolate, oval or triangular, entire and always without stipules. Flowers irregular, and various in form. Those of the true Polygalas, which are the only species commonly met with, resemble the blossoms of the pea, but are provided with a curious tufted appendage, which, taken along with the exstipulate leaves, serves at once to distinguish them from the Leguminosæ, and as a ready personal characteristic for themselves. The family is rather extensive, scattered all over the world, and remarkable for various medicinal properties, bitterness predominating. The only British species is a pretty little herbaceous evergreen, with lanceolate leaves, and slender stems, 3—9 inches long, erect when growing among hay-grass, more or less procumbent when in open places where there is nothing taller to compete with. The flowers grow in terminal racemes, and are violet-blue, rose-coloured, or white.

HABITATS AND DISTRIBUTION.

COMMON MILKWORT—*Polyg'ala vulga'ris.*

Rich meadows and pastures, also upon moors, by waysides, and on dry slopes of hills; common. Fl. May—August.

E. B. ii. 76; Baxter, iv. 251.

The beauty of this little flower lies in a portion of the *calyx*, three of the sepals composing which are minute, while the other two are large and of the same colour as the three little narrow petals, and sometimes have an admixture of green. After blooming, these two larger sepals become wholly green, and clasp the flat and two-lobed ovary.

Several slight varieties have been distinguished as species, the principal of them under the names of *Polyg'ala ama'ra* or *calca'rea*, (E. B. Supp. ii. 2764.) and *Polyg'ala depres'sa* or *oxyp'tera* (E. B. Supp. iii. 2827.)

Polyg'ala Chamæbux'us, (Bot. Mag. ix. 316.) a diminutive shrub, from the Alps, with leaves like those of the box-tree, and yellow flowers with purple tips, appearing in March and April, is common in gardens; and in green-houses there are many beautiful Cape species of the same genus, with large pea-like purple or crimson flowers, and conspicuous crest of paler hue. Besides these, there are species of *Muraltia* and *Heisteria*, generally distinguishable by their irregular flowers and two large coloured sepals.

XXXIV. THE HORSE-CHESNUT FAMILY.—*Sapinda'ceæ.*

A family for the most part stately and aristocratic, various in value and properties, widely diffused in India and South America, but altogether extra-European, and in England scarcely known except in the horse-chesnut itself,—*Æs'culus Hippocas'tanum*,—that magnificent tree which, in its noble septate leaves and superb hyacinth-like pyramids of white blossoms, flushed, like sea-shells, with pink and yellow, and lighting up every bough to the topmost pinnacle of the glorious fabric, as if with lamps for some jubilee or royal gala, supplies one of the most imposing spectacles in nature. The large, smooth, shining, mahogany-coloured seeds, as they drop in October from the prickly capsules, are no less beautiful in their kind than the flowers and foliage. No tree expands it leaves more rapidly, or furnishes a finer example of a bud. The former, in their luxuriance and lively green, contribute one of the happiest sights of spring, and in autumn are remarkable for their fine yellow, and the disarticulation of their broad and long-stalked fans. The scarlet horse-chesnut, a much smaller tree, is the *Æs'culus Pa'via.* Another small species, called *Æs'culus gla'bra*, is distinguished by its compact panicles of greenish-yellow blossoms and narrow leaflets. There is also a yellow variety of the *Pa'via.* Less known, but a great ornament wherever planted, is the *Kölreute'ria panicula'ta*, a deciduous tree rising 30—40 feet high, with pinnate leaves, the leaflets ovate and coarsely serrated, and fine loose terminal panicles of tetramerous yellow flowers. In autumn it is covered with large bladdery capsules, and the leaves change to a deep yellow. Indoors are occasionally found the *Cardiosper'mum*, (Bot. Mag. xxvi. 1049.) so named from the little round seeds being impressed with the exact figure of a heart, as drawn upon playing-cards; and young specimens of the *Eupho'ria* or *Dimocar'pus Litchi*, the celebrated Chinese tree which produces the fruit of the latter name. Soap-berries are the produce of the *Sapin'dus Sapona'ria.* The celebrated "snake-seed" from Demerara, common, like all the preceding, in collections of botanical curiosities, is the embryo of the *Ophiocaryon paradox'um.*

XXXV. THE SUNDEW FAMILY.—*Drosera'ceæ.*

Sundews are very curious and pretty little plants, inhabiting wet moors in almost every part of the world, and found abundantly in Britain. The leaves, which are circular or spathulate, and petioled, usually grow in tufts so near the ground as to seem radical, sometimes lying flat upon the soil, sometimes standing erect. They are fringed along the margins, and clothed upon the upper surface with delicate hairs resembling pink eye-lashes, only that instead of tapering to a point they are tipped with oval glands, from which, in summer, exude drops of limpid gum, decking the plant with vegetable diamonds. Flower-stem from the bosom of the leaves, 3–6 inches high, and bearing an incurved, and sometimes branched raceme of minute white blossoms, which are raised at intervals of a day or two, one by one, to the apex of the arch, where they open, provided the sun shines, and not else. After once opening and closing, they never expand again. Corolla regular and usually pentamerous; stamens 5—8. Ovary single, with 5—8 styles. Fruit a many-seeded capsule.

Three species are indigenous to Britain.

1. Leaves circular, lying flat upon the ground, covering a space two or three inches in diameter. Petals and stamens five; styles six. ROUND-LEAVED SUNDEW.
2. Leaves narrow, five or six times as long as broad, widening from the base upwards, and erect. Seeds with a loose, chaffy coat. Petals and styles usually eight. Flower-stems much longer than the leaves. GREAT ENGLISH SUNDEW.
3. Leaves oblong, three or four times as long as broad, and erect. Seeds with a rough, not chaffy, coat. Petals and styles varying from six to eight. Flower-stems very little longer than the leaves. SMALL SUNDEW.

HABITATS AND DISTRIBUTION.

1. ROUND-LEAVED SUNDEW—*Dros'era rotundifo'lia.*

Wet moors and bogs, sitting chiefly on moist green cushions of *Sphagnum*, in little hollows among the heather, but sometimes more exposed, and then visible at a long distance through its redness. Occasionally upon dry commons, and then, through want of water, very minute. Fl. July, August.

Curtis, iv. 601; E. B. xiii. 867 (mislettered *D. longifo'lia*): Baxter, iii. 201.

2. GREAT ENGLISH SUNDEW—*Dros'era Ang'lica.*

In similar situations; less frequent than the round-leaved sundew, but commoner than the next. Exceedingly fine and abundant on the moors about Manchester. Fl. July, August.

E. B. xiii. 869.

3. Small Sundew—*Dros'era interme'dia.*

In similar situations, but seldomer. Very abundant on the moorland hills at Thurstaston, seven miles from Birkenhead Fl. July.

Curtis, iv. 602; E. B. xiii. 868 (both as *D. longifo'lia.* The E. B. figure is mislettered *D. rotundifo'lia.*)

These strange little plants are in perfection from the end of June to near the middle of August, when no one interested in the marvels of nature should fail to look for them. Great numbers of minute flies are captured by the viscid drops, and, being dried to death by the sun, their corpses lie upon the leaves for many days. Possibly the gaseous matters given off during their decay may supply the plant with a kind of nourishment. Whenever, among the lower animals, life is taken away, it is not out of wantonness, but that the victim shall be used as food, and that which Providence has made a law in respect to the conduct of moving creatures, is probably as much a law, in its degree, in the case of the sundews.

Droseras grow well in a fernery, and even in a parlour, if kept in wet bog-moss, and protected by a glass shade. Some exotic species are also cultivated by the curious, such as the Australian *Dros'era bina'ta* (Bot. Mag. lviii. 3082.) The leaves of this beautiful plant are shaped like those of the Great English Sundew, but are broader and deeply cleft, the lamina presenting the figure of a V, while the petioles are several inches in length. The flowers are large and white. Some of the Australian species have creeping stems, and those of the Cape of Good Hope are yet finer and more attractive. In choice collections we also see the very wonderful *Dionæ'a muscip'ula*, or Venus' Fly-trap (Bot. Mag. xx. 785.) the leaves of which have two flat lobes, with stiff hairs projecting from the surface, the lobes folding together over insects that may chance to alight upon them. *Byb'lis liniflo'ra* is a minute but very pretty little blue-flowered aquatic from New Holland. *Aldrovan'da vesiculo'sa*, another very curious aquatic, from the south of Europe, is remarkable for its whorled, cellular, and shell-like leaves.

XXXVI. THE BLADDER-NUT FAMILY.—*Staphylea'ceæ.*

A small family of ornamental shrubs, represented in our pleasure-grounds by the principal species, the common bladder-nut or bag-nut,—*Staphyle'a pinna'ta*,—a native of central and eastern Europe. Garden-runagates have sometimes been mistaken for native examples, and recorded as such, but there is no reason to believe the plant even naturalised. Leaves opposite and pinnate, in size and general appearance resembling those of the elder-tree, but scentless. Flowers regular and pentamerous, the sepals spreading, and tinged externally with pink; the petals narrow, pure white, and erect. Stamens five; ovaries 2—3, coherent; styles long; fruit bladder-like. The beautiful pendulous clusters of blossoms, resembling chandeliers, and appearing in May, immediately distinguish it from every other inmate of the garden. The height is usually about ten feet. (E. B. xxii. 1560; Baxter, iii. 198.) The American *Staphyle'a trifo'lia* is seen occasionally.

XXXVII. THE DILLENIA FAMILY.—*Dillenia'ceæ.*

The fine plants here assembled stand midway between the Magnolia-family and the Buttercup-family. From the former they are distinguished by the absence of stipules, and by their pentamerous flowers: from the latter, by the permanence of the calyx; by some peculiarities in the stamens, (which in several genera are developed upon only one side of the pistil instead of in a circle round it, as happens in all other polyandrous flowers,) and by their general habit and aspect, most of the species being trees and shrubs. The central and most truly typical representatives have the primary veins of the leaves running straight from the midrib to the margin; and the whole are characterised by the presence of a peculiar covering to the seeds called the "aril," not unlike that which occurs in the nutmeg, the aril of which is the spice called "mace." The flowers, which are frequently yellow, are either solitary, or collected in terminal racemes or panicles. The family is almost entirely tropical, having its maximum in tropical Australia, India, and equinoctial America. The Indian kinds are remarkable not less for the magnificence of their bloom than for the grandeur of their foliage, and in several cases constitute fine timber-trees.

Several of the genera contribute to the beauty of our hot-houses, especially that from which the family is named, in the *Dille'nia specio'sa*, the leaves of which resemble those of the Spanish chesnut, but on a much larger scale; and the very handsome one which includes the *Hibber'tia volu'bilis* of New South Wales. *Hibber'tia corifo'lia* (Bot. Mag. liii. 2672.) is not unlike the little golden cistus or *Helian'themum*, of our own country. *Worm'ia denta'ta*, from Ceylon, two or three species of *Colber'tia*, the *Candol'lea cunei'for'mis*, the climbing *Deli'ma sarmento'sa* and *Tetrace'ra volu'bilis*, all with yellow flowers, and several others, are worthy of a place in every collection of striking plants.

XXXVIII. THE FUMITORY FAMILY.—*Fumaria'ceæ.*

Delicate herbaceous plants, glabrous and scentless in every part; the stems brittle, slender, and often scrambling, frequently succulent and half-transparent with watery juice; the leaves usually alternate, much divided and cut, with distinct branches like those of parsley, and in the scrambling species often tendrilled. Flowers in racemes; red, pink, yellow, or whitish; the parts in twos or fours; very irregular in shape, and distinguished by the two inner petals cohering at their tips, and forming a little pouch, which never opens of itself, and is often purple in the interior. The outer petals have a protuberance at the base, and the flower is often remarkably flat, with ridges at the sides, which render it four-angled, though thin and broad. Stamens six, the anthers combined in two sets of three each; pistil solitary; stigma with two blunt lobes, and nestling between the anthers in the pouch. Fruit a round or oblong capsule, one or few-seeded.

A small and unimportant family, but interesting from the singular conformation of the flowers. The species belong chiefly to the temperate latitudes of the northern hemisphere, and number about a hundred, two of them being British, and two others partially naturalised.

A. Flowers yellow or yellowish-white, without any red or purple at the extremity. Fruit a narrow and two-valved pod, containing several seeds.

Stems erect, bushy, 6—8 inches high, not climbing. Flowers yellow, nearly an inch long. Perennial. 1. YELLOW FUMITORY.

Stems very slender and entangled, climbing to the height of 1—2 feet, the leaves usually ending in branched tendrils. Flowers pale yellowish-white, very minute. Annual. 2. LITTLE CLIMBING FUMITORY.

B. Flowers pink or purple, sometimes very pale and almost white, but always with purple or reddish tips.

Plant, while young, forming a dense tuft of 6—8 inches in height, subsequently scrambling to an elevation of 2—3 feet by means of the twisted petioles. Branches much diffused. Fruit globular and one-seeded. Annual. 4. COMMON FUMITORY.

Stems simple, erect, 6—8 inches high, never scrambling upwards. Root tuberous. Flowers dull purple. Fruit a pod with several seeds. Perennial. 3. PURPLE SPRING FUMITORY.

HABITATS AND DISTRIBUTION.

1. YELLOW FUMITORY—*Coryda'lis lu'tea.*

A very old and favourite garden-flower, from the south of Europe, common upon rockeries, and partially naturalised in many places upon rocks, and in rough and stony places. Fl. May—August.

E. B. ix. 588 (as *Fuma'ria lu'tea.*)

2. LITTLE CLIMBING FUMITORY—*Coryda'lis clavicula'ta.*

Damp hedges, especially near and upon moorland, scrambling, by the help of the bushes, to the height of a yard or more; common. Fl. May—August. Annual.

E. B. ii. 103 (as *Fuma'ria clavicula'ta.*)

3. PURPLE SPRING FUMITORY—*Coryda'lis sol'ida.*

Another very common old garden-flower, originally from the continent, occasionally found half-naturalised in woods and groves to which it has escaped. Fl. April, May.

Bot. Mag. vii. 231; E, B. xxi. 1471 (both as *Fuma'ria sol'ida);* Baxter, iii. 190.

HABITATS AND DISTRIBUTION.

1. COMMON BERBERY—*Ber'beris vulga'ris.*

Hedges; common, but probably not aboriginal. Fl. May, June. Fruit ripe in September.

E. B. i. 49; Baxter, ii. 115.

Frequent in gardens and shrubberies; a beautiful ornament in early summer, and again in autumn, when hung with its copious fruit. The leaves, though in appearance simple, are in reality the terminal leaflets of pinnate leaves that have developed no lateral ones; and the triple thorns represent other leaves of which the woody fibre alone has been put forth. After attaining a stature of 7—8 feet, the berbery will live for two or three centuries, without materially increasing in size, though there are examples in which it has grown to nearly four times that height. The flowers are powerfully honey-scented, and to some persons disagreeable.

2. EPIMEDIUM—*Epime'dium alpi'num.*

An inhabitant of curious gardens, whence it appears to have migrated into subalpine woods in the Lake district and the lowlands of Scotland. Fl. May. Root perennial; stems annual.

E. B. vii. 438; Baxter, i. 47.

The principal foreign Berbery in cultivation is the *Maho'nia aquifo'lium*, a low-growing shrub with pinnate, thorny-edged, evergreen leaves, and dense, sessile panicles of yellow flowers, opening with the first steps of spring, and followed, in Sept., by clusters of purple berries, resembling little grapes. *Ber'beris empetrifo'lia*, (Bot. Reg. N. S. iii. 27.) *B. Nepalen'sis*, *B. arista'ta*, and several others, are deservedly frequent. *Nandi'na domes'tica* (Bot. Mag. xxviii. 1109.) is an elegant evergreen shrub, a native of China and Japan, and requiring the shelter of the greenhouse, where it attains the height of five feet. The leaves are twice or thrice ternate; the flowers white, with yellow anthers, and followed by red berries the size of a pea. *Leon'tice Altai'ca*, (Bot. Mag. lx. 3245.) *Leon'tice* or *Caulophyl'lum Thalictroi'des*, a very singular plant, *Epime'dium hexan'drum*, and the pretty little *Diphyllei'a cymo'sa* (Bot. Mag. xl. 1666.) with white flowers, are cultivated by the curious.

XL. THE FRANCOA FAMILY.—*Francoa'ceæ.*

Half-a-dozen Chilian plants compose this unimportant family, which is interesting only in one or two ornamental species of the typical genus. *Franco'a appendicula'ta* (Bot. Mag. lxi. 3168.) is an herbaceous perennial, with lobed radical leaves, and a leafless stem 2—3 feet high, which terminates in a long raceme of purplish tetramerous flowers, having eight stamens, a four-celled ovary, and a four-lobed stigma. It is not uncommon in good collections, where also are found *Franco'a sonchifo'lia* (Bot. Mag. lxi. 3309.) and *Franco'a ramo'sa*, the last-named with white flowers.

XLI. THE GRAPE-VINE FAMILY.—*Vita'ceæ.*

Shrubs with long and slender stems, climbing by means of axillary tendrils. Leaves petioled, simple, ovate and pointed, or broadly fan-lobed, or palmate, or even quinate. Flowers green, minute, regular, and either tetramerous or pentamerous; stamens 4—5; ovary solitary, ripening into an oval or globular berry; inflorescence in panicles or umbels. A few exceptions occur to these characters, but not in ordinary Botany.

The species, which number between two and three hundred, are natives of the milder and warmer parts both of the eastern and the western hemisphere, and especially of India, but none are indigenous to Europe. The birth-place of the grape itself, *Vi'tis vinif'era*, that good Samaritan of the kingdom of plants, and most illustrious tree in nature, appears to be the shores of the Caspian Sea, in latitude 37°. Brought to England many centuries ago, and everywhere planted against houses and sheltered walls for the beauty of its appearance, and in hope more or less reasonable, of grapes, it is only in the south that the vine ripens fruit worth eating, or at least with any regularity. In the north, unless encouraged with artificial heat, and protected with glass, the berries rarely differ much in appearance from green peas; the hindering nights of autumn chill their sap, and we have to look into the hot-house, where the disappointments of the open air are compensated a thousand-fold by the skill of our gardeners. The beauty of the foliage of the vine, especially when the sun has purpled the fruit, has given it a place in art from time immemorial. "Vignettes" are so called because originally consisting of little sketches surrounded with *viticulæ* or vine-trails.

Next in interest to the vine comes the Virginian-creeper, or *Ampelop'sis hedera'cea*, common as a summer tapestry for walls, even in the streets. Though deciduous, it is a great recommendation to this plant that in a year or two it will cover many square yards of desolate wall with its handsome quinate leaves, unassisted by training or nailing, and that in the autumn it assumes a fine red, which mingles admirably with the deep and polished green of ivy. The tendrils of the Virginian-creeper, instead of curling spirally, spread themselves out flat, like an expanded hand, every little finger putting forth an adhesive sucker at the tip, by which it cements itself firmly to the wall. In fine seasons it produces corymbs of small green flowers, followed by black berries. A third plant of the family, common in hot-houses, is the *Cis'sus dis'color*, very long and slender in the stems, and with large, ovate, pointed, and velvety leaves, puce-coloured below, and on the upper surface most beautifully flushed with gray and crimson. Several other species of Cissus are in occasional cultivation, as *heterophyl'lus*, *marmora'tus*, and *quinquefo'lius* (Bot. Mag. li. 2443.) The North American species of *Vitis* are said to be all diœcious. *V. Labrus'ca* and *vulpi'na* are prettily figured in Smith and Abbot's "Georgian Insects" (vol. i. 28 and 41.)

XLII. THE AILANTUS FAMILY.—*Xanthoxyla'ceæ.*

A small family of trees and shrubs, chiefly American, and represented in English gardens by three or four interesting species. The principal of these is the celebrated "Tree-of-heaven" or Ailantus, a native of the north of China. This noble tree often rises with us to a height of 20—60 feet, the trunk straight and erect, the leaves pinnate, resembling those of the stag's-horn sumach, but of prodigious size, being 2—4 feet long, and the leaflets glandular along the edges. Unlike those of the sumach, in autumn they do not change colour, remaining green till torn down by the frost. The flowers, which do not often appear, come in August. They are small, whitish-green, borne in large, upright, rather compact panicles, and of disagreeable odour; in structure pentamerous, partly unisexual and partly bisexual, with ten stamens and 3—5 ovaries. The fruit resembles that of the ash-tree, but is smaller. Next in importance is the Tooth-ache tree, or *Xanthox'ylum fraxin'eum*, deciduous, 6—12 feet high, with pinnate leaves of 4—5 pairs of leaflets and a terminal one, and prickles in the situation of stipules. The flowers, which appear in April, consist of a yellowish calyx only, and are produced in axillary umbels. They are diœcious, with the parts 3—5. For a good figure of this tree see Catesby's Carolina, i. 26. The *Pte'lea trifolia'ta*, or "Shrubby-trefoil," *(ibid.* ii. 83.) rises to the height of 6—20 feet, and is esteemed for its beautiful leaves, which consist of three ovate and acute leaflets, the middle one much tapering to the base. The flowers, which grow in corymbs, are small, greenish-white, monœcious, and usually tetramerous. The fruit, developed by August, is a flattened and winged capsule, not unlike that of the elm, but supported on a long peduncle, whereas the fruits of the elm are nearly sessile. Also esteemed for its foliage is the *Coria'ria myrtifo'lia.* The leaves of this are opposite, ovate-lanceolate, acute, glabrous, and on short petioles, much resembling myrtle. The branches being opposite, they themselves look like great pinnate leaves. Flowers in upright racemes, polygamous and pentamerous. The affinities of the genus *Coria'ria* are not yet satisfactorily determined. It may probably be the type of a distinct family.

XLIII. THE SOLLYA FAMILY.—*Pittospora'ceæ.*

Trees and shrubs, chiefly natives of New Holland and the eastern parts of Asia, with a few pretty representatives in our conservatories. *Pittospo'rum Tobi'ra*, (Bot. Mag. xxxiv. 1396.) long greatly esteemed, is a Japanese shrub with obovate, leathery, dark-green and glossy leaves; and dense umbels of cream-coloured and fragrant flowers on short pedicels. *Sol'lya heterophyl'la* (Bot. Mag. lxiii. 3523.) is an elegant plant with fine full-green and abundant foliage, the leaves alternate and lanceolate, and pendulous bright blue flowers in little cymes opposite the leaves. *Bursa'ria spino'sa* (Bot. Reg. 314.) is very showy when covered with its copious white blossoms. *Billardie'ra longiflo'ra* (Bot Mag. xxxvii. 1507.) is a handsome climber, with crimson flowers, succeeded by blue berries. *Marian'thus cæru'leo-puncta'tus* (Bot. Mag. lxviii. 3893.) is a charming twiner from the neighbourhood of the Swan River, with long elliptical leaves, and umbellate clusters of sky-blue flowers resembling those of Borage, the petals partly sprinkled with dark-lilac spots.

XLIV. THE RUE FAMILY.—*Ruta'ceæ.*

Shrubs, with the exception of the *Fraxinel'la*, and in every case exotic. Leaves opposite or alternate, usually covered with pellucid, resinous dots, and emitting a powerful and aromatic odour. Flowers usually regular, their parts in fours or fives, and the petals either separate or united. Style simple; stigmas as many as the cells of the ovary, and the fruit invariably capsular. The ordinary representative of the family is the common rue *(Ru'ta grave'olens)*, easily distinguished by its blueish-green, doubly-pinnatifid leaves, intensely bitter taste, combined with disagreeable smell, and tetramerous yellow flowers, with eight stamens. Next to it in frequency are the favourite greenhouse shrubs called *Corre'a*, *Boro'nia*, *Erioste'mon*, and *Dios'ma*, mostly from New Holland and the Cape of Good Hope. The beauty of these last it is impossible to overrate. Correas, as in the old-fashioned *Corre'a specio'sa*, often have woolly foliage, and tubular half-pendulous corollas an inch in length, crimson with the exception of the green margin, and the whole surface of the flower rough with microscopic stellate hairs. *Boro'nias* have four-petaled flowers, usually of an exquisite rose-colour, and extremely light and pretty leaves, which are either pinnatifid, as in the *Boro'nia pinna'ta*, or simple and undivided, as in the *B. serrula'ta* and the *B. crenula'ta* (Bot. Mag. lxviii. 3915.) The *Erioste'mons* (Bot. Mag. lv. 2854.) are distinguished by their white and star-like flowers; the

Dios'mas incline more to the rosaceous form; those of the *Crow'ea salig'na* (Bot. Mag. xxv. 989.) resemble orange-blossom; those of the *Crow'ea latifo'lia* are peach-colour. But a page of names would not exhaust the list. No plants are more lovely than the *Spiranthe'ra odoratiss'ima* and the *Erythrochi'ton Brazilien'se* from South America. *Adenan'dra uniflo'ra* (Bot. Mag. viii. 273.) and *amœ'na* (Bot. Reg. 553.) are very ornamental. *Agathos'ma cilia'ta* (Bot. Reg. 360.) is well-known for its fragrance. *Coleone'ma pul'chrum*, (Bot. Mag. lxi. 3340.) *Lemo'nia spectab'ilis*, (Bot. Reg. N. S. iii. 59.) and various species of *Almei'dea*, *Diplolæ'na*, *Acrade'nia*, &c., are exceedingly beautiful. The herbaceous Fraxinella, (*Dictam'nus Fraxinel'la*) a plant with leaves like those of the ash-tree, and tall racemes of large, irregular pink flowers, that seem to concentrate the perfumes of all the spice-islands, is not rare in superior gardens. The odour of this flower, which is occasionally white, only lasts an hour or two after the stem is broken.

XLV. THE BYTTNERIA FAMILY.—*Byttneria'ceæ.*

Trees and shrubs of warm and chiefly tropical climates, represented by several of the smaller species in our hot-houses and conservatories. Their affinities are on the one hand with the mallow-family; on the other with the lime-tree family. They are remarkable, in many cases, for their forked and branched hairs, which sometimes thickly cover the surface of the leaves and other parts. The flowers are pentamerous, the stamens usually 5—10, the filaments united, and the anthers two-celled and turned inwards; the leaves are simple, alternate, and usually somewhat serrate; the inflorescence is generally in panicles or clustered spikes. The favourite genera for cultivation are *Lasiopet'alum*, (Bot. Mag. xlii. 1755, 1766.) *Thoma'sia*, (Bot. Mag. xxxvi. 1485, 1486.) *Herman'nia*, (Bot. Mag. ix. 299, 307.) and *Maher'nia*, (Bot. Mag. x. 353.) *Corethrosty'lis bractea'ta* (Bot. Reg. N. S. vii. 47.) is a charming Australian shrub with fragrant foliage and profusion of long loose racemes of starlike and rosy flowers, the colour of which resides in the bracts, while the centre is deep purple. *Astrapæ'a Wallich'ii* (Bot. Mag. li. 2503.) is one of the most splendid flowering-plants in the world. *Dom'beya cannabi'na* (Bot. Mag. lxiv. 3619.) resembles it on a smaller scale, and in yellow instead of red.

Excelling all these in value is the *Theobro'ma Caca'o*, the seeds of which are the "cocoa-beans" of the grocers' shops, and the basis alike of prepared cocoa, in its various forms, and of chocolate. This tree is a native of Demerara, where whole forests consist of nothing else.

XLVI. THE ELATINE FAMILY.—*Elatina'ceæ.*

Extremely minute plants, allied to the Carnation family, but differing in their capitate stigmas, and ovary of three or more cells. They occur throughout the northern hemisphere, inhabiting marshes and the borders of lakes and ponds.

Two species grow wild in Britain.

1. Stems and branches forming matted and creeping tufts, half an inch to two inches in length. Leaves opposite and entire. Flowers very minute, rose-coloured, on little pedicels. Petals and styles three. Stamens six. COMMON ELATINE.
2. Similar to the Common Elatine, but with the flowers sessile, four whitish petals, four styles, and eight stamens. WELSH ELATINE.

HABITATS AND DISTRIBUTION.

1. COMMON ELATINE—*Elat'ine hexan'dra.*

Margins of pools and meres, forming turfy masses, and often under water; rare, but probably in many cases overlooked, by reason of its minuteness. Fl. July, August. Annual.

E. B. xiv. 955 (as *E. Hydropi'per*); Baxter, vi. 487.

The seeds are most beautifully ribbed and transversely striated. When left exposed to the sun by the water becoming low, the whole plant assumes a bright-red hue.

2. WELSH ELATINE—*Elat'ine Hydropi'per.*

Apparently very rare. East end of Llyn Coron, Anglesea. Surrey. Scotland. Fl. summer. Annual.

E. B. Supp. i. 2670.

XLVII. THE MELIA FAMILY.—*Melia'ceæ.*

A widely diffused family of trees and shrubs, almost entirely tropical, and in England known perhaps in no other species than the common Bead-tree, or *Me'lia Azeda'rach.* (Bot. Mag. xxvii. 1066.) This singular and beautiful tree is a native of India, but is now naturalised in the south of Europe, and well-known to all who have travelled in Italy, where, as in other countries of the same faith, the seeds are used for rosaries. The leaves are doubly ternate; the flowers, produced in pendulous panicles, are pentamerous, pale-lilac or purplish, with spreading petals, and the filaments of their ten long purple stamens cohering so as to form a tube, within the orifice of which the anthers are sessile; the ovary is solitary and free. The Bead-tree is not very common, but well deserves a place in every green-house.

XLVIII. THE TETRATHECA FAMILY.—*Tremandra'ceæ.*

The members of this pretty little family are slender heath-like shrubs, found only in New Holland, and familiar in good green-houses in the very elegant and free-flowering plants called *Tetrathe'ca.* The stems of the *Tetrathe'ca verticilla'ta* are almost hair-like, yet erect and diffused, with distant whorls of about ten filiform and reflexed leaves. The long axillary peduncles bear solitary flowers of a rich blue, the calyx and corolla consisting each of five pieces, with ten stamens and a solitary ovary. *Tetrathe'ca hirsu'ta* (Bot. Reg. N. S. vii. 67.) has flowers of a deep rose-colour.

XLIX. THE CARNATION FAMILY.—*Caryophylla'ceæ.*

Neat and often beautiful herbaceous plants, for the most part slender and fragile, (though the perennial species are prone to become woody) and in many cases glaucous. Stems varying from an inch to three feet high (4—8 feet in the tree-carnation) frequently forked, and readily separable at the joints, where the bases of the internodes are then generally swollen. Leaves opposite, simple, undivided and entire, or only slightly serrulate; often more or less connate; more frequently sessile than petiolate; usually more or less oval or lanceolate and pointed, and always without stipules. Inflorescence usually in corymbs or fascicles. Flowers regular; sepals five, or sometimes four; petals of the same number, often deeply cleft, and not infrequently with a fringe of long and acute serratures. Stamens almost always ten, by deficiency sometimes five, or four, or three. Ovary solitary, raised on a short stalk, or inserted in a ring, on which the petals and stamens are likewise placed; styles 2—5, long, white, and slender, with the stigmas running along the inner surface. Fruit (except in *Cucu'balus)* a one-celled capsule, opening by twice as many teeth or valves as there are styles, with a free central placenta, which is formed, not as in other families, of the accrescent margins of carpels, but upon a prolongation of the axis. Seeds generally numerous, often kidney-shaped and embossed with tubercles, or embroidered with wavy patterns, and strikingly beautiful when magnified. The flowers have a strong tendency to become double; they are of all shades and tones of red, rarely blue or yellow, and very often pure white. In the smaller kinds the petals are sometimes absent; and both in these and in some of the large and handsome species, such as the corn-cockle, the petals are not infrequently shorter than the sepals. Not many are fragrant, though the perfume of the representative species is incomparable. Some kinds of *Lych'nis* and *Sile'ne* are unisexual by defect. *Cucu'balus stella'tus* (Bot. Mag. xxviii. 1107.) has its leaves in whorls of four.

Over a thousand species are known, natives of the temperate and cold parts of both hemispheres, and often creeping to the very edge of perennial snows. With all the advantages given by number and variety in place of growth, properties however they can hardly be said to possess, except that a few are reputed slightly deleterious, the great mass of the family being remarkable for little but insipidity. The only economic species is the soap-wort, which, when bruised and agitated in water, raises a lather like soap, available in some degree for washing.

About fifty grow wild or as colonists in Great Britain, many being weeds and inconspicuous; but the larger kinds, especially the different species of Lychnis and Stellaria, contributing abundantly, in early summer, to the floral gaiety of our woods and hedgerows. Besides these fifty, ten or twelve varieties have been named and figured as species, the chief part of them being sports of the little weeds with white flowers. Three true species, often included in British Floras, are now rejected, namely, *Stella'ria scapig'era*, (E. B. xviii. 1269.) *Arena'ria fastigia'ta*, (E. B. xxv. 1744.) and *Buffo'nia* or *Bufo'nia an'nua* (E. B. xix. 1313; Baxter, ii. 152.) The gay red-flowered annual *Sapona'ria Vacca'ria* (Bot. Mag. xlix. 2290.) is said to appear sometimes in cornfields, and may some day be reckoned among species that have become naturalised. *Arena'ria Balea'rica* is establishing itself upon walls and garden-buildings at Abbotsbury, Dorset.

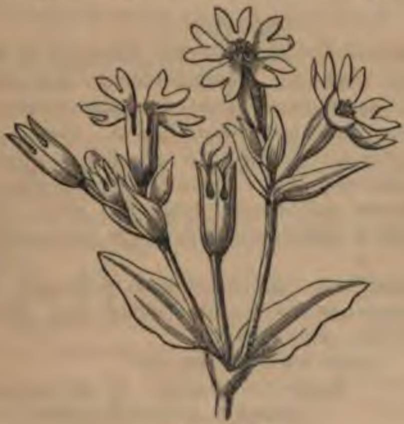

Fig. 100.
Rose Lychnis.

The family is technically distinguished into two great tribes or sub-families called *Silenoi'deæ* and *Alsinoi'deæ*. The former, or Lychnis sub-family, is characterised by the coherence of the sepals into a tube, and by the stamens arising from the stalk of the ovary; in the latter, or Stellaria sub-family, the sepals are perfectly free, and the stamens arise from a ring beneath the ovary, which last part is perfectly sessile.

A.

(SUB-FAMILY *Silenoi'deæ.*)

Calyx tubular, campanulate, or bag-like, owing to the cohesion of the sepals for at least half their length. Flowers pentamerous. Stamens ten. Ovary single. Styles two, three, or five (rarely, by non-development, only four.) Stamens and pistils occasionally upon separate individuals.

SECTION I.

Two or more conspicuous bracts outside the calyx, forming an involucrum. Petals jagged or crenate. *Styles two.* Capsules opening, when ripe, by four little valves. Stamens sometimes very short, and *quasi*-abortive.

1. Involucrum much shorter than the calyx. Plant perennial.
    - Involucrum half the length of the calyx; the bracts usually two. Leaves deep green. Stems 6—12 inches high much branched. Flowers rose-coloured, dotted with white; or white, with a circle of darker spots in the centre, and *scentless.* 5. MAIDEN PINK.
    - Involucrum only a quarter the length of the calyx. Plant glaucous. Leaves nearly or more than an inch long. Flowers pale pink or white, and *fragrant.*
        - Leaves with rough margins.
            - Stems 2—5 flowered, 12—18 inches high. Petals laciniated as far as the middle. 4. PHEASANT'S-EYE PINK.
            - Stems mostly one-flowered, 3—12 inches high. Petals irregularly crenate. 6. CHEDDAR PINK.
        - Leaves with smooth margins. Bracts four, very short, ovate or almost rhomboidal. Petals irregularly laciniated. Flowering-stems 12—18 inches high, panicled. 3. WILD CARNATION.
2. Involucrum as long as the calyx. Plant annual. Flowers small, in compact terminal clusters, scentless, and expanding only one at a time. Stems 6—18 inches high, stiff and erect.
    - Bracts ovate, broad, dry, shining and membranous; enveloping the calyces of several deep-coloured flowers. Stem glabrous. 2. PROLIFEROUS PINK.
    - Bracts lanceolate, leaflike in texture, and downy. Flowers rose-coloured, dotted with white. Branches somewhat downy. 1. DEPTFORD PINK.

(Silenoi'deæ)

SECTION II.

No bracts outside the calyx.

1. Flowers with stamens only.

    a. Petals cleft or notched.

    Plant 1—2½ feet high, green, hairy, and loosely branched. Leaves ovate-oblong and usually pointed. Flowers large and handsome, and with a central coronet formed of appendages that spring from the angles of the petals.

    Flowers usually red, occasionally pink or white, scentless, and open all day.

    20. SYLVAN ROSE LYCHNIS (male plant.)

    Flowers pure white, not opening till evening, and faintly scented.

    21. WHITE EVENING LYCHNIS (male plant.)

    Little alpine moss-like plant, not more than 2—3 inches high, consisting of numerous short branches, which are concealed by the crowded linear leaves. Flowers purple or white, and very pretty. 9. ALPINE MOSS CAMPION (male plant.)

    b. Petals linear, without any cleft or notch. Stem nearly simple, erect, 12 inches high. Flowers small, numerous, yellowish, and in loose opposite clusters. 12. SPANISH CATCHFLY (male plant.)

2. Flowers with pistils only.

    a. Styles five. Plant 1—2½ feet high, green, hairy, and loosely branched; leaves ovate-oblong, usually pointed; flowers large and handsome, and with a central coronet formed of appendages that spring from the angles of the petals; capsule opening by ten little valves.

    Flowers usually red, scentless, open all day. Capsule nearly globular; the ten valves recurved.

    20. SYLVAN ROSE LYCHNIS (female plant.)

    Flowers pure white, not opening till evening, and faintly scented; capsule ovoid, the ten valves erect or nearly so.

    21. WHITE EVENING LYCHNIS (female plant.)

    b: Styles three.

    Little alpine, moss-like, densely-tufted plant, 1—3 inches high. Leaves linear, concealing the branches. Flowers purple or white, solitary, and very pretty. Petals slightly notched.

    9. ALPINE MOSS CAMPION (female plant.)

    Stem nearly simple, erect, 12 inches high. Flowers small, yellowish, and in loose opposite clusters. Petals linear and without a notch. 12. SPANISH CATCHFLY (female plant.)

3. Flowers with both stamens and pistils.

    A. *Styles two*, the number never increasing. Stems 12—18 inches high, stout and glabrous. Leaves ribbed, ovate-lanceolate, 2—3 inches long. Flowers numerous, rose-coloured or whitish, and forming a large panicle. *Calyx not bladder-like.* Capsule opening by *four* teeth. 7. SOAP-WORT.

(*Silenoi'deæ*. Section II. No bracts outside the calyx)

B. *Styles three*. Fruit a smooth and shining *purple berry*, not covered by the calyx. Stems 2—3 feet high, much branched, weak and straggling. Flowers axillary and terminal, solitary and drooping. Leaves ovate-lanceolate. Calyx bell-shaped, tinged with purple. Petals distant, spreading, cleft, greenish-white or cream-coloured. 8. BERRY-CAMPION.

C. *Styles usually three*, occasionally two or four. Fruit a *dry capsule*.

I. Calyx *glabrous*. Leaves ovate-lanceolate or linear. Plant glaucous and usually glabrous. Petals cleft.

Calyx *remarkably inflated*, bladder-like, whitish, veined with purple and green. Flowers usually pure white; rarely pink, and without a central coronet. Capsule opening by *six* valves, and concealed in the calyx.

Stem erect. Flowers numerous, half-pendulous, half an inch across. Young seeds white.
10. COMMON BLADDER-CAMPION.

Stem decumbent. Flowers few, often solitary, large, and erect. Ovary usually black and shining. Young seeds lively purple.
11. SEASIDE BLADDER-CAMPION.

Calyx not remarkably inflated. Flowers with a central coronet, crowded into level-topped corymbs, usually rose-colour, occasionally white. Stem erect, glabrous, 12—18 inches high, viscid for the length of an inch a little way below the flowers. 18. LOBEL'S CATCHFLY.

II. Calyx *downy or hairy*. Flowers pale pink or whitish.

a. Flowers solitary in the axils of the upper leaves. Leaves lanceolate. Plant hairy and viscid. 13. ENGLISH CATCHFLY.

b. Flowers in panicles. Plant *perennial*.

Flowers half-pendulous. Segments of the petals linear, the claws with appendages at the angle that form a coronet in the centre of the blossom. Flower-stems 1—2 feet high. Leaves lanceolate. Flowers 3—5 together, on short opposite peduncles, white, expanding only at night.
14. NOTTINGHAM CATCHFLY.

Flowers nearly erect. Segments of the petals broad, the claws without coronet appendages. Calyx nearly an inch long.
15. ITALIAN CATCHFLY.

c. Flowers in panicles. Plant *annual*. Calyx contracted at the top.

Calyx conical, with 25—30 vertical ribs. Stem nearly simple, six inches high. Flowers purplish, few and inconspicuous.
16. STRIATED CORNFIELD CATCHFLY.

Calyx long and tubular, with ten ribs. Plant 1—2 feet high. Flowers rather large, sweet-scented, opening at night.
17. NIGHT-FLOWERING CATCHFLY.

(*Silenoi'deæ.* Section II. No bracts outside the calyx.)

D. *Styles five* (rarely, by defect, only four.)

Calyx with five long narrow green segments projecting far beyond the corolla. Stem 2—3 feet high. Leaves long and narrow. Flowers on long solitary peduncles. Whole plant covered with soft, whitish, and silky hairs. Petals not cleft, usually reddish-purple. Seeds large and black. 19. CORN-COCKLE.

Calyx shorter than the corolla.

Petals cut into four linear segments, the two middle ones the longest. Stems 1—3 feet high, stiff, erect, slender, and reddish. Leaves few, narrow-lanceolate. Flowers in loose terminal panicles, red (or rarely white) and scentless.

22. MARSH LYCHNIS.

Petals simply cleft, or notched at the extremity.

Flowers in loose panicles. Leaves oval-oblong. Stems 1—2½ feet high. Flowers red or pink.

20. SYLVAN ROSE LYCHNIS (exceptionally.)

21. WHITE EVENING LYCHNIS (exceptionally.)

Flowers in close, sessile, opposite clusters, forming oblong terminal heads. Leaves long and narrow. Petals rose-coloured.

Stems very viscid, 6—12 inches high. Petals slightly notched.

23. VISCID MOUNTAIN LYCHNIS.

Stems not viscid, 4—6 inches high. Petals narrow, deeply cleft.

24. RED ALPINE LYCHNIS.

B.

(SUB-FAMILY *Alsinoi'deæ.*)

Sepals unconnected, or only very slightly adherent at the base; thus not forming a tubular or bag-like calyx, but a star-like one, which is always *green.* Flowers *white,* (rarely with a pink tinge) generally insignificant, though in a few cases large and showy. Petals occasionally absent. Plant often inconspicuous and weedy. Flowers sometimes tetramerous. Stamens normally ten; sometimes 5—4.

SECTION I.

Petals and sepals each *four.*

1. Petals undivided. Leaves linear or narrow lanceolate. Stamens four.

Petals as long as the calyx. Plant *glaucous.* Flowers few, large for the size of the plant. Capsule opening at the summit by eight or ten inconspicuous valves. 25. MŒNCHIA.

Petals shorter than the calyx. Plant minute, *green,* and moss-like. Flowers extremely minute. Calyx spreading when the capsule is ripe; the latter opening by four large valves resembling petals.

39. COMMON PEARLWEED.

2. Petals cleft. Stamens four. 36. COMMON MOUSE-EAR (exceptional.)

(*Alsinoi'deæ.*)

SECTION II.

Petals *five*, distinctly *cleft;* often deeply so, and then making it appear as if there were ten; sometimes unequally toothed; occasionally absent.

1. Styles three.

* Leaves egg-shaped, or heart-shaped, the lower ones usually petiolate.

Petals shorter, or scarcely longer, than the calyx.

Lower leaves ovate, cordate, the lower ones petiolate. Stems with lines of white hairs upon the opposite sides. 33. COMMON CHICKWEED.

Plant quite glabrous. Flowers in little dichotomous and lateral panicles. Petals cleft to the base. 32. BOG CHICKWEED.

Flowers in umbels of 3—8. Pedicels bent down while the seed is ripening; erect before and after. Capsule opening into six teeth. *Petals unequally toothed*, rather longer than the calyx. Plant 3—6 inches high. Stamens about three. 26. HOLOSTEUM.

Petals twice as long as the calyx. Plant 1—3 feet high. Flowers in large, elegant, diffuse, and brittle clusters, the pedicels long and slender. Hairs upon the stem and branches scattered irregularly. 31. BROAD-LEAVED SYLVAN STITCHWORT.

** All the leaves linear or narrow-lanceolate, and sessile, or nearly so.

a. Stems erect, or nearly so. Flowers conspicuous.

Leaves finely serrulate. Petals always longer than the calyx. Sepals ribless. 28. SATIN-FLOWER.

Leaves not serrulate.

Flowers in large, loose, much-branched panicles. Petals usually shorter than the calyx. Sepals three-ribbed. 29. GRASS-LEAVED STITCHWORT.

Flowers upon long, solitary and axillary peduncles. 30. GLAUCOUS STITCHWORT.

b. Stems prostrate and intricately branched. Peduncles 2—4, mostly terminal. Flowers large, pure white, the petals twice as long as the sepals. 34. ALPINE STITCHWORT.

c. Stems weak and trailing. Sepals combined at the base. Petals much shorter than the calyx. Flowers inconspicuous, in little lateral panicles. 32. BOG CHICKWEED.

d. Plant moss-like, scarcely raised above the surface of the ground. Flowers extremely minute, embedded among the foliage, and usually without petals. 27. CHERLERIA.

(*Alsinoi'deæ.* Section II. Petals five, and distinctly cleft.)

2. Styles five (occasionally, by defect, four or three.)
    Petals shorter, or scarcely longer, than the calyx. Stems simple, or more or less branched, erect or procumbent, 2—12 inches long or high, usually hairy and viscid. Leaves ovate or lanceolate. Stamens usually 10, sometimes 5. Capsule twice as long as the calyx, slightly curved or bent, and with 10 slender teeth. 36. COMMON MOUSE-EAR.
    Petals considerably longer than the calyx.
        Leaves cordate, the lower ones petiolate, the upper ones sessile. Stems weak and straggling, 18—24 inches long, branched, and with glandular hairs all round. Flowers solitary in the forks of the stem. 35. MARSH STITCHWORT.
        Leaves narrow, lanceolate, or oblong. Flowers large and handsome for the size of the plant.
            Leaves obtuse. Stems 3—6 inches long or high, much branched at the lower part, prostrate or ascending; flowers few.
                Plant sub-glabrous or downy. 37. ALPINE MOUSE-EAR.
                Stems glabrous, or with alternate lines of hairs; styles mostly 3. 34. ALPINE STITCHWORT.
            Leaves pointed. Stems 4—12 inches long or high. Flowers in dichotomous panicles, brilliant white. 38. FIELD MOUSE-EAR.

SECTION III.

Petals *five, undivided.*

1. Styles three.
    a. Leaves egg-shaped.
        Leaves thick and fleshy, acute, sessile, and glabrous, about half an inch long, the upper ones smaller, very numerous, and disposed in four dense vertical rows. Stems numerous, a few inches high. Flowers few, nearly sessile, often unisexual, and opening only in sunshine. *Sea-shore plant.* 42. SEA CHICKWEED.
        Leaves thin, not fleshy.
            Petals shorter or scarcely longer than the calyx.
                Sepals three—five-ribbed. Plant stiff and shrub-like, much branched, 3—6 inches high. Leaves minute, pointed, nearly sessile. Flowers minute, on solitary upright peduncles from the forks of the stem. 44. THYME-LEAVED SANDWORT.
                Sepals one-ribbed and very pointed. Plant tender, prostrate or nearly so, the branches 4—12 inches long. Leaves petiolate, half an inch or more in length, with three distinct ribs. Flower-stalks rather longer than the leaves. 43. FALSE CHICKWEED.

(*Alsinoi'deæ.* Section III. Petals five, undivided. Styles three. *a.* Leaves egg-shaped, thin, not fleshy.)

Petals much longer than the calyx. Stems much branched, the flowering ones 2—3 inches high. Leaves with short stalks; usually ciliated at the base. Flowers rather large.
48. Alpine Sandwort.

b. Leaves linear or subulate.

Petals about as long as, or longer than, the sepals. Stems erect or decumbent, forming tufts 2—6 inches high. *Perennial.*

Pedicels usually downy or hairy. Flowers innumerable, white and starlike. 45. Vernal Sandwort.

Pedicels often an inch long, or more, and always glabrous.
46. Bog Sandwort.

Petals about half as long as the sepals. Pedicels about half an inch long. Plant slender, erect, much branched, 3 – 4 inches high. *Annual.* 47. Fine-leaved Sandwort.

2. Styles five. Leaves linear, minute. Plant branchy, prostrate or ascending, 1, 2, 3, 4 inches high. Flowers minute.

a. Sepals obtuse.

Petals shorter than the calyx.

Calyx spreading when the capsule is ripe. Styles reflexed.
39. Common Pearlweed (exceptional.)

Calyx permanently erect. Styles erect.
40. Alpine Pearlweed.

Petals longer than the calyx. Upper leaves with clusters of very small ones in their axils. Flowers terminal, 1—3, conspicuous. Plant erect, slim and elegant.
41. Knotted Pearlweed.

b. Sepals pointed. 45. Vernal Sandwort.

SECTION IV.

Petals *absent* (not as an absolute rule, but in individuals.) Sepals four or five.

Styles three. Flowers embedded among the foliage. 27. Cherleria.

Styles or sessile stigmas four or five. Flowers bisexual, on long peduncles.

Plant green and glabrous. 39. Common Pearlweed.

Styles about five. Plant hairy or viscid. 36. Common Mouse-ear.

HABITATS AND DISTRIBUTION.

1. Deptford Pink—*Dian'thus Arme'ria.*

Dry gravelly pastures and hedgebanks; rare. In Suffolk not uncommon. Fl. July, August. Annual.

Curtis, iii. 401; E. B. v. 317.

2. Proliferous Pink—*Dian'thus pro'lifer.*

Gravelly pastures, and by waysides, where dry; rare. Southern and south-eastern counties. Fl. July. Annual.

E. B. xiv. 956.

3. WILD CARNATION—*Dian'thus Caryophyl'lus.*

Upon old walls and ruins, chiefly of castles, in Kent, but not truly wild. Fl. July.

E. B. iii. 214; Baxter, ii. 81.

The origin of the incomparable carnation of the garden, of which there are four principal varieties, namely, "Selfs," represented in the clove-carnation, the deep crimson unvariegated flower; "Bizarres," in which the petals are streaked and blotched over their whole surface, two or more shades of red and pink being superadded to the ground colour; "Flakes," in which entire petals are of distinct and brilliant colours, white or yellow being the ground, and crimson or purple the ornamental addition; and lastly, "Picotees," in which the petals are white or yellowish, with a fringe of coloured lines along the margin. Besides these four, there are varieties in which the petals are variously speckled and mottled, but without blotches. The "tree-carnation" (*D. Caryophyl'lus* var. *frutico'sus*) is one of the finest plants that can be placed against a sunny garden-wall. A rare and very curious variety of the Carnation, called the "Wheat-ear," figured in the Botanical Magazine for 1814, (xxxix. 1622.) has the bracts at the base of the calyx indefinitely multiplied, and piled up like the scales of a fir-cone. In fully developed specimens there is no corolla, and the spike is literally like a green ear of wheat.

4. PHEASANT'S-EYE PINK—*Dian'thus pluma'rius.*

Old walls at Ludlow, and elsewhere in Shropshire, also in Kent; a native originally, like the preceding, of central and southern Europe, and in England only half-naturalised. Fl. summer.

The original form of the innumerable varieties of the flower called the Pink in gardens.

5. MAIDEN PINK—*Dian'thus deltoi'des.*

Dry borders of fields, and upon gravelly and sandy banks, extending as far north as Ross-shire; rare. Not found in Ireland. Fl. June—August.

Curtis, iv. 613; E. B. i. 61.

A variety with the petals nearly white, very glaucous herbage, and usually four bracts to every flower, has been distinguished as *Dian'thus glau'cus.*

6. CHEDDAR PINK—*Dian'thus cæ'sius.*

Upon the romantic limestone cliffs at Cheddar, Somersetshire; the only locality in Britain. Fl. June, July.

E. B. i. 62.

7. SOAP-WORT—*Sapona'ria officina'lis.*

Banks, borders of woods, by river-sides, &c.; in some parts abundant, but rather local. Fl. July—September.

Curtis, i. 102; E. B. xv. 1060; Baxter, i. 37.

In gardens occasionally, with the flowers double. In the wild state it is also found double, not very rarely.

8. Berry-campion—*Cucu'balus bac'cifer.*

Reported at various times from different localities in the south-east, but very doubtfully indigenous. Fl. summer.

E. B. xxii. 1577; Baxter, vi. 507.

9. Alpine Moss-campion—*Sile'ne acau'lis.*

Mountains of Scotland and northern Ireland, of which it forms one of the loveliest ornaments, growing in densely matted tufts, "like cushions of greenest moss, covered with myriads of rosy flowers." Common everywhere above the altitude of 2,000 feet. Sparingly upon the mountains of North Wales and the Lake district. Fl. June, July.

E. B. xvi. 1081.

The name *acau'lis* applies only to the distant appearance of this exquisite little plant, true stems being developed, though short and half-prostrate.

10. Common Bladder-campion—*Sile'ne infla'ta.*

Waysides, borders of dry fields, and upon dry hedgebanks, and earthy, weed-inhabited walls; common. Fl. June—August.

E. B. iii. 164 (as *Cucu'balus Be'hen.*)

11. Seaside Bladder-campion—*Sile'ne marit'ima.*

Dry fields and in all dry waste ground near the sea; common. Also by alpine rills. Fl. July, August.

E. B. xiv. 957.

This beautiful plant is probably only a variety of the *infla'ta.* The copious and pure-white bloom renders it one of the greatest ornaments of the coast, and enlivens even the rocky and sea-beaten island of St. Kilda, westward of the Hebrides, in latitude 58°, where it forms one of the principal ingredients of the scanty Flora. It occurs with pink flowers in Connemara, and has been found with double flowers in Devonshire. Both varieties are preserved in curious gardens.

12. Spanish Catchfly—*Sile'ne Oti'tes.*

Sandy fields and waste places in Norfolk, Suffolk, and Cambridgeshire. Fl. July, August.

E. B. ii. 85.

13. English Catchfly—*Sile'ne Ang'lica.*

Sandy and gravelly fields; not uncommon. Isle of Wight, plentiful. Fl. June, July. Annual.

Curtis, ii. 250; E. B. xvii. 1178.

A variety, with a dark red spot upon every petal, looking like a wound, and thence called *Sile'ne quinquevul'nera,* (E. B. ii. 86.) is occasionally seen in flower-gardens, and has sometimes been found half-naturalised.

14. Nottingham Catchfly—*Sile'ne nu'tans.*

Dry and stony places in many parts of England and the south of Scotland. Not found in Ireland. Fl. June, July.

E. B. vii. 465.

15. Italian Catchfly—*Sile'ne Ital'ica.*

Upon the cliffs at Dover. Fl. June, July.

E. B. Supp. ii. 2748 (as *Sile'ne pa'tens.*)

16. Striated Cornfield Catchfly—*Sile'ne con'ica.*

Dry waste places in Kent and thereabouts; rare. Fl. July. Annual.

E. B. xiii. 922.

17. Night-flowering Catchfly—*Sile'ne noctiflo'ra.*

Appears occasionally as a weed among corn, where the ground is dry. Fl. July. Annual.

E. B. v. 291.

18. Lobel's Catchfly—*Sile'ne Arme'ria.*

A very common and favourite old garden-flower, which occasionally wanders into the fields for a season or two, and then disappears. Fl. summer. Annual.

E. B. xx. 1398; Baxter, ii. 120.

19. Corn-cockle—*Githa'go se'getum.*

Cornfields, bringing its purple flowers to a level with the young ears of grain. Often also among vetches. Fl. June—August. Annual.

Curtis, i. 172; E. B. xi. 741; Baxter, iii. 175 (all three as *Agrostem'ma Githa'go.*)

20. Sylvan Rose Lychnis—*Lych'nis sylves'tris.*

Hedgebanks and shady lanes; everywhere. Still more plentiful in damp woods, such as those in Cheshire, of which it forms one of the most striking decorations in May and June, as soon as the blue of the forget-me-not has faded. A flower is often opened as early as April, and a few lingering blossoms, upon lateral branches, may be found as late as October, and when the season is mild, later still, though the plant be ragged and threadbare.

> "Even in their ashes live their wonted fires!"

Curtis, i. 105; E. B. xxii. 1579 (as *Lych'nis dioi'ca, flo're ru'bro.*)

Now and then it occurs with white flowers, and, in old-fashioned gardens, is commonly seen double.

21. White Evening Lychnis—*Lych'nis vesperti'na.*

Arable fields and hedgebanks; often among corn, and in dry waste places, where the soil has been enriched; plentifully disseminated, but never growing in masses, like the *sylves'tris*. Fl. June—September; the blossoms opening about five or six p.m., a pretty novelty at the close of a day's excursion, and in evening-walks along country-lanes.

E. B. xxii. 1580 (as *Lych'nis dioi'ca, flo're al'bo.*)

The stamen and pistil-bearing flowers of these two plants (which probably represent only one true species) are readily distinguished, without taking the trouble to open them, by simply compressing the calyx between the fingers, when, if it be a female flower, the ovary will be felt, solid and round, whereas in the male flower there is no resistance. They may be told by the very look of the calyx, which the presence of the ovary renders ovate and bulging in the female, while in the male it is narrow and contracted. In both kinds the female plant is usually taller and more robust, but with fewer blossoms than the male, and though seldom distant many yards, rarely grows intermingled with it. No plants better show the structure of a capsule and free central placenta; and as they ripen fruit abundantly, it is easy to procure specimens. The capsules are plentiful by the dog-days, and may be gathered throughout the autumn. They open by ten pointed valves, every capsule becoming a crater which boils over with purple seeds. A form of this beautiful and familiar plant, possibly intermediate between the white and red, occurs sometimes with bisexual flowers, and the petals pale pink or flesh-coloured.

22. Marsh Lychnis—*Lych'nis Flos-cu'culi.*

Moist places in old meadows; swampy waysides, and on the borders of ponds, where the ground is saturated with wet, and the summer vegetation is rich and various; common. In meadows that are uniformly damp, it sometimes nearly supersedes the grass, and might be reaped like so much corn. Fl. June, July.

Curtis, i. 33; E. B. viii. 573; Baxter, i. 71.

The pretty and delicate pink flowers, which have a rent and tattered look, as if beaten by the wind, (whence the rustic name of "ragged-robin") are in perfection just before hay-making, or when the cuckoo is in full cry, and quiver till the scythe of the mower comes, after which they are seldom seen in plenty. They are exceedingly perishable, and difficult to carry home unwithered. A white variety occurs in the fields, and a double red one is found in gardens.

23. Viscid Mountain Lychnis—*Lych'nis Visca'ria.*

Dry alpine rocks in North Wales and Scotland; rare. Glen Farg, six or eight miles from Perth, abundant. Fl. June.

E. B. xi. 788.

24. Red Alpine Lychnis—*Lych'nis alpi'na.*

Rocks upon the summit of the Clova Mountains, Fifeshire, at an elevation of 3,200 feet above the level of the sea. Fl. June, July.

E. B. xxxii. 2254; Bot. Mag. xi. 394.

25. MŒNCHIA—*Mœnch'ia erec'ta.*

Dry, waste, sandy places, and among grass; not uncommon in England and Scotland, but in Ireland not hitherto observed. Plentiful in Norfolk and Hampshire. Fl. May, June. Annual.

Curtis, i. 84; E. B. ix. 609 (both as *Sagi'na erec'ta*); Baxter, vi. 460.

26. HOLOSTEUM—*Holos'teum umbella'tum.*

Old walls in Norfolk and Suffolk; not rare. Elsewhere in England almost unknown. Fl. April, May. Annual.

Curt. iii. 492 (as *Ceras'tium umbella'tum*); E. B. i. 27; Bax. iv. 299 (petals incorrect.)

27. CHERLERIA—*Cherle'ria Sedoi'des.*

Summits of the Scottish mountains, especially those of the Breadalbane range, where it unites with *Sile'ne acau'lis, Saxif'raga oppositifo'lia*, and other species of the same genus, to form the essential portion of the herbage. Fl. June—August.

E. B. xvii. 1212; Baxter, iv. 316.

28. SATIN-FLOWER—*Stella'ria Holos'tea.*

Hedgebanks, everywhere, in early summer, decking them with innumerable white stars that look like snow, a rival of the rose lychnis in putting forth its flowers, and generally the winner in the race.

Curtis, i. 103; E. B. viii. 511.

In Cheshire this plant is called "Breakbones," from the readiness with which the joints of the stem come apart. Elsewhere, from the same circumstance, "Snap-stalks." It is remarkable alike for the profusion of its bloom, the brilliant purity of its ribbed and recurving petals, against which the yellow anthers show conspicuously, and for the grassy look of its herbage. The latter, instead of disappearing in the winter, as happens with most perennial wild-flowers, lingers straggling about the hedge-banks, and sprouts with the first steps of the opening spring. The leaves are smallest at the base of the stem, where they are often not more than three quarters of an inch long, and gradually increase upwards, at last becoming two inches or more in length. They are nearly horizontal, the alternate pairs crossing at right angles.

29. GRASS-LEAVED STITCHWORT—*Stella'ria gramin'ea.*

Grassy and bushy places, everywhere, growing amidst stronger plants, delighting in their shelter, and running up prettily among their branches, being weak and brittle, and unable to stand erect. Fl. June—August; and, in remnants, throughout the autumn.

E. B. xii. 803.

By August the panicles become so much divaricated as to resemble mistletoe in their many broad angles and long straight internodes.

30. GLAUCOUS STITCHWORT—*Stella'ria glau'ca.*

Wet and marshy places, margins of lakes, &c.; rare, though widely distributed. Fl. June, July.

E. B. xii. 825.

31. BROAD-LEAVED SYLVAN STITCHWORT—*Stella'ria nem'orum.*

Banks of rivers where shaded by trees, and in moist woods; principally in the north of England and the lowlands of Scotland. Plentiful near Manchester, bordering the Irwell and the little streams that strengthen its current, and one of the prettiest nemoral plants of the district. Fl. May, June.

E. B. ii. 92; Baxter, ii. 154.

Plants growing on river banks are generally concurrent with them, their seeds and roots being washed along by floods, and deposited as the water subsides.

32. BOG CHICKWEED—*Stella'ria uligino'sa.*

Wet and shady ditchbanks; common. Fl. May—August. Annual.

Curtis, ii. 392; E. B. xv. 1074.

33. COMMON CHICKWEED—*Stella'ria me'dia.*

Everywhere, and in blossom always. Annual.

Curtis, i. 20 (as *Alsine me'dia*); E. B. viii. 537.

A most variable plant, rising in woods sometimes to the height of a child, but distinguishable, under all conditions, by the ridge of white hairs that runs along one side of every internode, shifting at every joint to the *opposite* side. The Alpine Stitchwort sometimes has similar lines of hairs, but in that there are five styles, and the petals are longer than the calyx.

34. ALPINE STITCHWORT—*Stella'ria Cerastoi'des.*

Scotland, upon the Breadalbane mountains, and others to the north of that range. Also near Bantry, Ireland. Fl. July, August.

E. B. xiii. 911.

This plant has in some of its states all the characters of a Cerastium, whence it is sometimes called *Ceras'tium trigy'num.*

35. MARSH STITCHWORT—*Ceras'tium aquat'icum.*

Moist ditch-banks and swampy places, in most of the English counties, but rare. Fl. July.

Curtis, i. 34; E. B. viii. 538.

36. COMMON MOUSE-EAR—*Ceras'tium vulga'tum.*

Waste dry places, on walls, and cottage-roofs, sometimes in moist and shady places; common everywhere. Fl. spring—autumn. Annual.

E. B. xi. 789, &c., as below.

One of the most variable of our native plants, and hence, by some botanists, divided into half a dozen different "species," viz.:—

Ceras'tium glomera'tum—Tall and luxuriant, the flowers in a compact head. Moist and shady places; common. Fl. April—June. Curtis, i. 107; E. B. xi. 789 (as *C. vulga'tum.)*

Ceras'tium visco'sum—Much branched at the base, and the branches mostly procumbent. Dry places. Curtis, i. 108; E. B. xi. 790.

Ceras'tium semidecan'drum—Stamens five. Dry places. Fl. March, April. Curtis, i. 106; E. B. xxiii. 1630.

Ceras'tium pu'milum—Similar to the preceding. Curtis, ii. 394.

———— *tetran'drum*—Flowers tetramerous. Dry places, chiefly near the sea. Fl. May, June. Curtis. ii. 395. E. B. iii. 166 (as *Sagi'na Cerastoi'des.)*

Ceras'tium atrovi'rens—Similar to the preceding.

———— *peduncula'tum*—The same.

For particulars respecting these various forms, or most of them, consult Babington's "Manual." All are distinguishable from other common plants of the kind, by the long cylindrical capsules, projecting considerably beyond the calyx, slightly bent when ripe, and fringed at the rim with bristle-form teeth. Most of the varieties are more or less hairy and viscid, and generally have atoms of dust adhering to the stalks and leaves.

37. Alpine Mouse-ear—*Ceras'tium alpi'num.*

Wet and rocky places among the mountains of the Scotch highlands, especially upon the Breadalbane range; abundant. Rare, if extant, in England, and not hitherto noticed in Ireland. Fl. July, August.

E. B. vii. 472.

The commonest form of this plant is usually covered with a short, rigid, yellowish pubescence, and has been distinguished as *Ceras'tium latifo'lium* (E. B. vii. 473.) The rarer one is either glabrous or clothed with silky hairs.

38. Field Mouse-ear—*Ceras'tium arven'se.*

Dry fields and gravelly banks; generally distributed, but rare. Chiefly in the north. Fl. summer months.

Curtis, ii. 393; E. B. ii. 93; Baxter, iv. 286.

39. Common Pearlweed—*Sagi'na procum'bens.*

On garden paths, where it is often a troublesome weed, and in flower-beds, where neglected, or seldom dug up; also at the bottom of damp and shaded walls, and in poor and moist pastures, where the grass is thin; extremely common. Fl. all summer. Annual; sometimes perennial.

Curtis, i. 157; E. B. xiii. 880; Baxter, iii. 199.

The calyx spreads out flat when the capsule is ripe, and holds it like a cup in a saucer, the plant then looking much more as if in flower than while it is really so, the petals being almost microscopic. Small and slender individuals, without petals, and lasting only one season, have been regarded as a distinct species, and called *Sagi'na apet'ala* (Curtis, ii. 306 : E. B. xiii. 881.) Others, growing by the seaside, with a reddish tinge, and fleshy leaves, characters such as frequently occur in plants so circumstanced, are likewise considered a species, and called *Sagi'na marit'ima* (Curtis, iii. 454 ; E. B. xxxi. 2195.) Still minuter differences have supplied characters for the *Sagi'na cilia'ta*, *S. deb'ilis*, and *S. den'sa*, concerning which see Babington's "Manual." A double-flowered variety is figured by Baxter.

40. Alpine Pearlweed—*Sagi'na saxat'ilis.*

Dry stony places in the mountainous districts. Common in the Scotch Highlands. Fl. June, July.

E. B. xxx. 2105 (as *Sper'gula Saginoi'des.*)

A form with the peduncles and calyx glandular and hairy, and the latter of the same length as the petals and capsule, is registered as *Sper'gula subula'ta* (E. B. xvi. 1082.) This is the *Sper'gula Saginoi'des* of Curtis (ii. 255.)

41. Knotted Pearlweed—*Sagi'na nodo'sa.*

Wet and sandy places, especially in the hollows among the sandhills upon the coast; sometimes upon walls and rocks, where damp; common. Fl. July, August.

Curtis, ii. 251 ; E. B. x. 694 (both as *Sper'gula nodo'sa.*)

42. Sea Chickweed—*Arena'ria Peploi'des.*

Sandy seashores, often close to the wet wrinkles left by the tide, or half-buried in the drifting particles that, unlike the *Eryn'gium*, it is too small to resist; common. Fl. summer.

E. B. iii. 189.

Remarkable for its ovate and fleshy leaves, regularly disposed in four vertical rows, so as to render the branch of foliage square.

43. False Chickweed—*Arena'ria triner'via.*

Damp and shady hedgebanks and woods; frequent. In Scotland rather less so. Fl. May, June. Annual.

Curtis, ii. 251 ; E. B, xxi. 1483.

44. Thyme-leaved Sandwort—*Arena'ria serpyllifo'lia.*

Walls and dry sandy places; common in the south, less so in the north. Fl. July. Annual.

Curtis, ii. 252 ; E. B. xiii. 923.

45. Vernal Sandwort—*Arena'ria ver'na.*

Dry stony places in the mountainous districts of the north, especially in Scotland; rather uncommon. Fl. summer.

E. B. viii. 512 ; Baxter, v. 384.

The *Arena'ria rubel'la* of Curtis, iv. 614, and E. B. Supp. i. 2638, a little Arctic plant growing upon the summits of the Breadalbane mountains, especially among the micaceous shale of the highest corries of Ben Lawers, is not specifically distinct.

46. BOG SANDWORT—*Arena'ria uligino'sa.*

Moors at Widdy-bank, Teesdale, Yorkshire; very rare. Fl. July.

E. B. Supp. iv. 2890.

47. FINE-LEAVED SANDWORT—*Arena'ria tenuifo'lia.*

Dry sandy fields, and waste and stony places, in Norfolk, Cambridgeshire, and thereabouts. Sparingly in Scotland. Fl. June. Annual.

E. B. iv. 219.

48. ALPINE SANDWORT—*Arena'ria cilia'ta.*

As a British plant only observed hitherto upon limestone cliffs near Ben Bulben, Sligo, Ireland, and upon a serpentine hill in Unst, one of the Shetland isles. Fl. August, September.

E. B. xxv. 1745.

The Shetland plant has the leaves succulent and glabrous instead of ciliated, and also differs slightly in the broader sepals. It is generally treated in Floras as a distinct species, under the name of *Arena'ria Norve'gica* (E. B. Supp. iii, 2852.) A melancholy interest attaches to it, the original observer having been Thomas Edmonston (then only 11 years old), whose untimely death while with H. M. S. *Herald*, on the west coast of America, accorded in painfulness with that of poor Douglas in California, and added one more to the noble army of martyrs.

The cultivated *Caryophylla'ceæ* partake much of the character of the wild Lychnis, one of the handsomest, the refulgent "scarlet," or *Lych'nis chalcedo'nica*, with petals of fire, belonging to the same genus. *Lych'nis ful'gens* from Siberia, and *Lych'nis grandiflo'ra* from China, are also very splendid. Rose-campions, *Sile'nes* of different species, and *Gypsoph'ilas*, are frequent, and the most charming of the family are universal. These are the sweet-william, or *Dian'thus barba'tus*, nature's play-ground of red and white; the pink, the Indian pink, and the spicy carnation. The pink and carnation are generally double, and in numerous varieties, especially the latter, of which there are four principal classes, as mentioned on p. 201. The white rock mouse-ear, or *Ceras'tium tomento'sum*, is a well-known little plant with hoary herbage and white flowers, everywhere used as a silver edging to beds of blue Lobelia and scarlet geranium. *Sapona'ria Cala'brica* and *Sile'ne Schaf'ta* (Bot. Reg. N. S. ix. 20.) are favourite annuals. *Dry'pis spino'sa* (Bot. Mag. xlviii. 2216.) is remarkable in the family for its thorny-pointed leaves. *Sper'gula pilif'era* is valued as supplying a lawn-like carpet. *Dian'thus super'bus* (Bot. Mag. ix. 297.) has the petals extraordinarily fimbriated; *Dian'thus ferrugin'eus* (Bot. Reg. N. S. ii. 15.) has *yellow* flowers. One of the most charming of the ornamental annuals is the original Rose-campion or *Agrostem'ma cœli-ro'sa* (Bot. Mag. ix. 295.) The German pink, or *Dian'thus Carthusiano'rum*, (Bot. Mag. xlvi. 2039.) is a good old border-flower, cultivated since 1573. *Mœhring'ias* are pretty little rockery-plants.

L. THE ORANGE FAMILY.—*Aurantia'ceæ.*

Orange and Lemon-trees are immediately known by their leaves, which are 2—4 inches long, oval and pointed, perfectly glabrous, full of translucent dots, and have the lamina articulated with the petiole, the latter being often broad, and resembling a smaller leaf. The white and fragrant flowers are axillary and pentamerous, with numerous stamens and a solitary ovary. These precious trees are natives of the East Indies, but have been carried to every country in the world that is either warm enough for their culture out of doors, or can supply them with the shelter of a crystal palace. The common orange,—introduced in 1595,—is the *Ci'trus Auran'tium;* the lemon, the *Ci'trus Limo'num.* The citron, the lime, the shaddock, and other well-known and delicious fruits of similar nature, are produced by species of the same noble genus. Besides these, there are now not uncommonly seen in good collections, the *Glycos'mis citrifo'lia*, or *Limo'nia parviflo'ra*, from China, and an interesting little shrub with red berries, like those of the Ardisia, called *Skim'mia Japon'ica.* The articulation of the lamina of the leaf to the petiole, the transparent and dot-like receptacles of volatile oil, and the free and solitary ovary, distinguish them from all other plants they may resemble.

LI. THE CAPER FAMILY.—*Capparida'ceæ.*

A family of herbaceous plants, shrubs, and trees, chiefly found in the tropics, and in the countries bordering on them, and in structure strongly resembling the Cruciferæ, from which they are ordinarily distinguished by their numerous stamens and kidney-shaped seeds. When the stamens are so few as six, they are not tetradynamous. The four-petaled Papaveraceæ they resemble still more nearly; but in the Capparids the calyx does not fall when the corolla expands, and the seeds are destitute of albumen. A few only are cultivated, and those chiefly in hot-houses and conservatories, the principal being the common caper-bush or *Cap'paris spino'sa*, (Bot. Mag. ix. 291.) the unopened flower-buds of which (collected and prepared in the south of Europe) are the "capers" esteemed as a pickle. In habit this plant is rambling and trailing, like a bramble; the leaves are oval or roundish, succulent, rather glaucous, and deciduous, with spines in the place of stipules. The flowers (rarely produced in Britain) are numerous, axillary, solitary, large and handsome, white faintly tinged with red or lilac, and scentless. The stamens, which have long purple filaments, are about sixty. The solitary ovary is elevated upon a long and slender stalk resembling a style, the ovary itself resembling a stigma, while the true stigma is minute and sessile. This singular structure is frequent in the Capparidaceæ, and indicates a degree of affinity with the Passion-flowers. The dark-green, bushy, and milky-juiced plant commonly called caper-tree in gardens, has no affinity with the genuine caper, being a species of *Euphor'bia* or spurge, as will be noticed in due course; neither has the true caper a relative in the *Tropæ'olum* or nasturtium, the seeds of which, being used for the same purpose, are also popularly called capers. Among the ornamental species occasionally grown are the *Cleo'me lu'tea*, (Bot. Reg. N. S. iv. 67.) and the *Cleo'me dendroi'des*, (Bot. Mag. lxi. 3296.) a remarkable Brazilian plant, with a flower-spike resembling a candelabrum, the corolla purple, and the filaments of the six stamens 2—3 inches long. *Stepha'nia Cleomoi'des* from the Caraccas, and several species of *Cratæ'va* and *Gynandrop'sis*, are also esteemed for their beauty.

LII. THE AMARANTH FAMILY.—*Amaranta'ceæ.*

Herbaceous plants, with simple, undivided, entire leaves, and minute flowers, consisting of calyx only, but often so brightly-coloured, and produced in such plenty, as to render the mass of the inflorescence showy, and even superb. They belong chiefly to the tropics, and in the colder regions of the world exist only in cultivation. One species is half-naturalised in England,—an insignificant weed, with procumbent stems, ovate and obtuse leaves, and small lateral clusters of trimerous and triandrous green flowers.

HABITATS AND DISTRIBUTION.

BLITE AMARANTH—*Amaran'tus Bli'tum.*

Waste ground and manure-heaps; sometimes as a garden-weed; rare. Fl. August, September. Annual.

E. B. xxxi. 2212; Baxter, vi. 482.

To this family belong the splendid cockscomb or *Celo'sia crista'ta*, resembling a vertical and undulated mass of crimson velvet; and the *Celo'sia au'rea*, or golden cockscomb, the flowers of which are produced in dense panicles. Perfect blossoms of these two plants must be looked for on the lower part of the inflorescence, the upper portion being often only a wilderness of bracteas. Another charming species is the globe-amaranth, or *Gomphre'na globo'sa*, the heads of crimson or white flowers resembling clover, and borne on the summits of tall bare peduncles 5—6 inches long. *Amaran'tus specio'sus* and *pyramida'lis* have clusters of crimson spikes. *Achyran'thes* or *Chamisso'a altis'sima* is a beautiful hot-house plant from Jamaica, attaining the height of 5 feet. *Iresi'ne* furnishes several pretty species. Out-of-doors there are the Love-lies-bleeding, or *Amaran'tus cauda'tus*, its long green or blood-red tails lasting till the end of autumn; the

Prince's-feather, or *A. hypochondri'acus*, resembling the *cauda'tus*, but erect, and with deep-red foliage; and the *A. tri'color*, esteemed for its variegated leaves. *Deering'ia Celosioi'des*, (Bot. Mag. liv. 2717.) a hardy plant, although like some of the others, from the East Indies, has numerous racemes of insignificant white flowers, followed by berries red as coral.

LIII. THE ILLECEBRUM FAMILY.—*Illecebra'ceæ.*

A little family nearly allied to the smaller *Caryophylla'ceæ*, and often distinguishable from them only by the presence of membranous stipules. The greater portion are insignificant weeds, though pretty when examined in detail, with the aid of a magnifying-glass. The flowers are pentamerous, usually minute, and often without petals. The species, of which there are about a hundred, belong chiefly to the south of Europe and the north of Africa, certain kinds often forming a densely-matted and silvery vegetation upon dry plains where nothing else will grow. Some authors call this family *Paronychia'ceæ*, after the name of one of the exotic genera. Six species occur in Britain, but all, except the red-sandwort and the corn-spurrey, are rare plants of the extreme south. *Hernia'ria hirsu'ta* (E. B. xx. 1379; Baxter, iv. 304.) is not now considered native.

A. *Leaves alternate,* linear or oblong, and very glaucous. Stems numerous, mostly procumbent. Flowers minute, white, crowded into little heads at the extremities of the branches. Stamens five. Stigmas three. 1. Corrigiola.

B. *Leaves in opposite pairs,* the lower pairs so close together as to *resemble whorls of four.* Branches prostrate, 3—4 inches long. Flowers minute and numerous. Stamens usually three. Styles three. 4. Polycarpon.

C. *Flowers green,* minute and granular, very numerous, crowded in the axils of the little oval and opposite leaves over the whole of the prostrate and much branched stems, which are 3—6 inches long. Stamens five. Stigmas two, nearly sessile. 2. Herniaria.

D. *Flowers white and shining,* very minute, and *crowded in whorls* in the axils of the little opposite and broadly-ovate leaves, for the whole length of the numerous and thread like branches, the latter more or less procumbent, 2—6 inches long, and much entangled. 3. Illecebrum.

E. Flowers white or pink, conspicuous when expanded, stellate or rosaceous. Petals undivided. Stamens usually ten. Fruit capsular. Seeds numerous. Leaves linear or cylindrical.

Styles usually three. Flowers usually pink. Stems and branches numerous, prostrate, 3—12 inches long. Leaves opposite. Stipules conspicuous. 5. Red Sandwort.

Styles five. Flowers always pure white, in terminal and forked cymes, the peduncles reflexed when they are overblown. Branches erect, 6—12 inches high. Leaves 1—2 inches long, in opposite clusters of seven or eight. Stipules inconspicuous. 6. Corn Spurrey.

HABITATS AND DISTRIBUTION.

1. Corrigiola—*Corrigi'ola littora'lis.*

Sandy coasts of Devonshire and Cornwall. Abundant on the shingly margin-banks of the Loo Pool, near Helston. Fl. July—September. Annual.

E. B. x. 668; Baxter, iv. 312.

2. Herniaria—*Hernia'ria gla'bra.*

Sandy ground near the Lizard, Cornwall, and in the Channel Islands; rather rare. Fl. July—September.

E. B. iii. 206.

A variety, with the leaves ciliated, is described under the name of *Hernia'ria cilia'ta* (E. B. Supp. iii. 2857.)

3. Illecebrum—*Ille'cebrum verticilla'tum.*

Marshy and boggy ground in Devonshire, rather rarely; in Cornwall not uncommon. Fl. July—September.

E. B. xiii. 895; Baxter, vi. 471.

4. Polycarpon—*Polycar'pon tetraphyl'lum.*

Waste sandy places near the seaside, in the south-west of England and the Channel Islands; rare. Fl. summer. Annual.

E. B. xv. 1031; Baxter, ii. 155.

5. Red Sandwort—*Spergula'ria ru'bra.*

Dry gravelly and sandy heaths, commons, hill-sides, and waste places; often in little-frequented country lanes, and upon the half-dried mud of the sea-shore. Very generally distributed. Fl. summer. Annual and biennial.

E. B. xii. 852 (as *Arena'ria ru'bra.)*

By some botanists this plant is called *Lepig'onum*, and divided into half-a-dozen species. Others make of it the genus "*Stipularia.*" When growing by the sea-side it is often larger and more succulent; the leaves are thicker, the capsule is more corpulent, and the seeds are usually provided with a white border. It is then the *Arena'ria mari'na* of E. B. xiv. 958. Another seaside form is barely an inch high.

6. Corn Spurrey—*Sper'gula arven'sis.*

Farmland, especially in cornfields, where the soil is sandy; common. Near Manchester, extremely abundant. Fl. June, July. Annual.

Curtis, ii. 323; E. B. xxii. 1535: Baxter, v. 388.

The flowers expand only during sunshine, and are then, like the Stellarias, conspicuous from their snowy whiteness. The apparent whorls of leaves consist in reality of opposite pairs, with clusters of other leaves in their axils, the axillary buds which unfolded them having failed to elongate into branches. (Compare the fasciated leaves of *Berbe'ris vulga'ris.*)

A variety with only five stamens is figured in E. B. (xxii. 1536.) under the name of *Sper'gula pentan'dra.*

LIV. THE PURSLANE FAMILY—*Portulaca'ceæ.*

Herbaceous annuals and perennials resembling the *Caryophylla'ceæ*, from which they are distinguished by having only two sepals instead of five, and by a strong tendency to succulence. They are scattered all over the world, but sparingly, and in the British Flora are only known in the "blinks," a little densely-tufted plant, with minute white flowers, drooping at first, and composed of five slightly-united petals, three of which are smaller than the others, three (or rarely five) stamens, and three stigmas. The capsules of black seeds ripen abundantly. The English name is derived from the sensitiveness of the blossoms to the light.

HABITATS AND DISTRIBUTION.

Blinks—*Mon'tia fonta'na.*

By streams and rivulets upon hills, and in nearly all wet and springy places where the water is clean. Fl. June, July. Annual.

Curtis, i. 153; E. B. xvii. 1206; Baxter, iii. 196.

In gardens and their vicinity there very often springs up a little weed with spoon-shaped root-leaves, and the uppermost stem-leaves combined into a green and slightly-concave plate, from the centre of which arise a few insignificant white blossoms. This is the *Clayto'nia perfolia'ta*, (Bot. Mag. xxxiii. 1226.) *Clayto'nia Alsinoi'des*, (xxxii. 1309.) figured in Baxter (iv. 253.) as a British plant, is said to be wild in woods near Perth and in Derbyshire. Upon rockeries is commonly cultivated a pretty species of the same genus, called Chinese chickweed, or *Clayto'nia Sibir'ica*, the flowers of which are lilac, and the leaves spoon-shaped. Among garden annuals none are more beautiful than the various species of *Calandrin'ia* and *Portula'ca.* The *C. dis'color*, *C. grandiflo'ra*, and *C. specio'sa*, (Bot. Mag. lxi. 3351 and 3369, and lxii. 3379.) and the *Portula'ca Thellusso'nii* (Bot. Reg. N. S. iii. 31.) and *P. Gillies'ii*, (Bot. Mag. lviii. 3064.) are especially attractive. The flowers of these plants possess all the sensitiveness of those of the *Montia.* They usually have numerous stamens, and in some the perianth is partially adherent to the ovary, so that, strictly speaking, they are perigynous. The common culinary purslane is *Portula'ca sati'va.*

LV. THE SUMACH FAMILY—*Anacardia'ceæ.*

A family of exotic trees, many of great beauty and value, and interesting at present as containing the Sumach, two kinds of which are commonly found in gardens. The best known is a tree of 8—20 feet in height, the branches generally crooked and deformed, and thickly clothed, while young, with dense reddish pubescence, resembling the down upon the antlers of young deer, whence, in connection with the misshapen character of the tree, its popular name of "Stag's-horn Sumach." During summer and autumn the boughs are loaded with noble pinnate leaves, composed of 5—7 pairs of leaflets, which in

October turn purplish, or yellowish-red. The large and solid crimson bouquets of flowers appear in August. All through the winter their relics remain upon the naked branches, in the shape of erect brown cones, a mournful spectacle, and at a distance might be taken for sparrows perched there for a while, silent and hungry. This is the *Rhus Typhi'na.* The other common species, called the Venetian or Venus' Sumach, is the *Rhus Cot'inus*, a shrub with obovate and entire leaves on long petioles, and large loose panicles of greenish-yellow blossoms. Many of the flowers are abortive; the peduncles of these lengthen out considerably and become hairy, rendering the panicle so delicately light and flimsy as to resemble marabout feathers, or the flossy tufts of the wild clematis, from which circumstance it is sometimes called the "wig-tree." The *Rhus Coria'ria*, or Elm-leaved Sumach, resembles the Stag's-horn Sumach, but is smaller. The leaflets are like the leaves of the elm, and the whitish-green flowers are produced in large loose panicles. The *Rhus Toxicoden'dron*, or Poison-Sumach, (Bot. Mag. xliii. 1806.) has trifoliolate leaves, the leaflets inciso-angular, and the odd one upon a petiole. The male flowers are produced in short, lateral, pale-green spikes, the females in loose panicles. *Rhus vernicif'era*, the Varnish-Sumach, is in general aspect like the Stag's-horn, but the leaves are much larger, and partake of the character of those of a walnut. The magnificent foliage renders it well worth cultivating, but at present it is rare. It is from this tree that the celebrated black Japan varnish is procured. The foliage of *Rhus venena'ta*, or Swamp Sumach, is also remarkably fine. In form the leaves correspond with those of the Stag's-horn, but they differ totally in surface and margin, the leaflets being entire, smooth, and shining, with the veins of a purplish-red colour. In autumn they change to an intense red or purple, and from the time when they begin to turn until they fall, which is with the earliest touch of frost, present the most beautiful appearance imaginable. Unfortunately this splendid plant is in a high degree poisonous. Besides the above, *Rhus Copalli'na* or Copal-Sumach, *Rhus rad'icans* or Poison-oak, the latter with trifoliolate leaves, and several others of the genus, are occasionally seen in arboretums. *Schi'nus Mul'li*, the Peruvian-mastich, and *Cneo'rum tricoc'cum*, a little evergreen with yellow flowers, and brownish-red three-lobed fruits, resembling those of the *Euphor'bia Lath'yris*, are comparatively old inhabitants of our gardens. *Duvau'a depen'dens* (Bot. Reg. 1573.) and *D. longifo'lia* (Bot. Reg. N. S. vi. 59.) are handsome evergreen bushes from Chili, with simple leaves, and numerous small greenish-yellow blossoms disposed in axillary racemes. To this family belong also the Terebinth-tree or *Pista'cia Terebin'thus*, and the Lentisk or *P. Lentis'cus*, both very rare in English gardens. The well-known "cashew-nut" is the produce of the *Anacar'dium Occidenta'le*, and in the violent acridity of its oil gives a fair idea of the usual properties of the family.

LVI. THE RIVINA FAMILY.—*Phytolacca'ceæ.*

Under-shrubs and herbaceous plants, chiefly from within or near the tropics, and nearly related to the *Chenopodia'ceæ*, from which they are distinguished by having the stamens *alternate* with the sepals, the stamens of the Chenopods being *opposite* those parts. A few species only are cultivated, the best being the *Busel'la viola'cea*, formerly called *Phytolac'ca decan'dra*. This beautiful plant has deep-green elliptical or lanceolate leaves, several inches in length, and produces abundant racemes of small white flowers, with green ovaries. The stalk of the raceme, which is 12—15 inches long, is rose-colour; the young three-lobed berries are grass-green, and the ripe ones deep purple, all four colours meeting in concert after the plant has been in bloom some little time. *Rivi'na hu'milis*, (Bot. Mag. xliii. 1781.) *R. la'vis*, (Bot. Mag. xlix. 2333.) and one or two others of the same genus are esteemed for their gay racemes of scarlet berries.

LVII. THE RHUBARB FAMILY.—*Polygona'ceæ.*

Herbaceous plants, frequently of coarse and ungainly habit in stems and foliage; the flowers numerous, individually minute, but often conspicuous in their large panicles or spikes. Leaves alternate, petiolate, simple, often broad and large, and always with membranous stipules, which form a thin semi-transparent sheath round the stalk, technically called an *ocrea*, and, generally speaking, sufficient to stamp the family. Perianth single, consisting of five or six pieces, which are often in two sets, an inner and an outer (in which case the inner set resembles a corolla), and regular or nearly so, with pink, white, or greenish as the predominant colour. Stamens 5—9, inserted on the base of the perianth. Ovary solitary, free, and surmounted by two or more styles or stigmas, the latter in some cases prettily feathered. Fruit usually a triangular or flattened achenium, quite free from the perianth, which is permanent, and forms an envelope to it. In the sorrels the flowers are often unisexual.

Few parts of the world are unacquainted with the *Polygona'ceæ*. In the northern hemisphere they occupy every meadow in the shape of sorrels, and every ditch and piece of waste ground as coarse docks and weedy persicarias, twining species of which latter creep into the cornfields. Farmers, however, do not object to them, since the seeds are farinaceous. Sorrel on the one hand, and rhubarb upon the other, may be taken as the representatives of their general qualities. In both of these oxalic acid is copiously formed; the stalks of rhubarb contain abundance also of malic acid.

In the tropics, besides the herbaceous species, there are tree-like Polygonaceæ, and others which have fruits very different from those of the European genera. But none of these are met with in ordinary Botany.

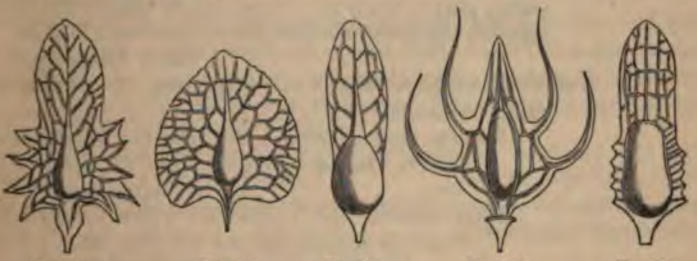

Fig. 101. *R. obtusifolius.* Fig. 102. *R. crispus.* Fig. 103. *R. sanguineus.* Fig. 104. *R. aureus.* Fig. 105. *R. acutus.*

Enlarged perianth-segments of Docks (considerably magnified.)

Twenty-four species, with several varieties, grow wild, or have become naturalised, in Britain. *Oxy'ria renifor'mis* is at once known by its kidney-shaped leaves; the remainder are docks and persicarias.

A.

Leaves kidney-shaped, fan-veined, about an inch broad, and chiefly radical. Stem 4—8 inches high. Flowers in a lightly-branched raceme. Perianth green, deeply four-cleft, the lobes in two sets, and the interior ones larger. Stamens six. Stigmas two. Fruit flattened, with a membranous wing. Plant glabrous and acid. 12. Mountain Sorrel.

B.

Perianth greenish or reddish, and consisting of three inner and three outer pieces; the interior pieces larger and more veiny, permanent, increasing in size as the fruit ripens, then converging round it, and one or more of them often bearing a tubercle. Stamens six. Anthers large, conspicuous, and pendulous. Stigmas tufted. *Leaves hastate, with pointed auricles.* Inflorescence in panicles formed of spikes which consist of dense whorls. Flowers mostly unisexual and diœcious. *Plant acid.*

Stems 2—3 feet high, juicy. Perianth-segments with tubercles on them. Auricles of the leaves pointing backwards. 10. Meadow Sorrel.

Stem 4—12 inches high. Perianth-segments without tubercles. Auricles of the leaves pointing horizontally. 11. Sheep's Sorrel.

C.

Perianth and inflorescence as in B, but the leaves more or less oval or lanceolate, never hastate, though often somewhat cordate at the base, and then with *rounded or obtuse auricles.* Flowers mostly bisexual. Plant *not acid.*

* One or more of the enlarged segments of the perianth bearing a tubercle.

1. Margins of the enlarged segments entire or nearly so.

Enlarged segments more or less cordate, two of them bearing small tubercles, and the third a large one. Stems 2—3 feet high, slightly branched. Leaves narrow, and acute, with *strongly-waved margins* (Fig. 102.) 5. Wave-leaved Dock.

Enlarged segments ovate or oblong. Leaf-margins flat or nearly so.

Stems 5—6 feet high. Lower leaves 18 inches long. Branches of the panicle erect or nearly so. Whorls mostly leafless. Enlarged segments with prominent veins, and all three with a tubercle. 4. Great Water Dock.

Stems 2—3 feet high. Leaves 4—8 inches long. Branches of the panicle spreading.

Only one segment usually with a tubercle. Whorls almost leafless. Segments broadest above the middle (Fig. 103.) 1. Changeable Dock.

Every segment with a tubercle. Whorls usually leafy. Segments broadest near the base (Fig. 105.) 2. Acute-leaved Dock.

2. Margins of the enlarged segments distinctly and deeply toothed.

Panicle erect. Pedicels longer than the perianth. Enlarged segments ovate. Stem 2—3 feet high, slightly branched. Leaves large, broad, and obtuse. Whorls usually distant and leafless (Fig. 101.) 3. Dairymaids' Dock.

Panicle spreading.

Leaves chiefly radical, cordate at the base, narrowed in the middle, like a violin. Stems very straggling. Whorls distant and leafy. Enlarged segments ovate. 7. Fiddle Dock.

Stem-leaves numerous, narrow-lanceolate or linear. Root, when cut, carmine-colour. Tubercles large and long.

Whorls densely crowded. Inner segments of the perianth deltoid and with long fine teeth (Fig. 104.) 8. Yellow Dock.

Whorls distant. Inner segments with short teeth. 8β. *Ru'mex palus'tris.*

** No tubercle upon any one of the enlarged segments, which are broadly cordate, entire, or nearly so, and reticulated. Whorls of flowers crowded and mostly leafless.

Leaves lanceolate; lower ones cordate-oblong. Petioles flat. Stems 3—4 feet high. 6. Grainless Dock.

Lower leaves very broadly cordate, 6 inches wide, very obtuse and wrinkled. Flowers unisexual and monœcious. Petioles channelled. 9. Monks' Rhubarb.

D.

Perianth in *five nearly equal segments*, the inner segments opposite the sides of the ovary, the outer ones opposite the angles. Stamens 5—8, the anthers small and inconspicuous. Styles 2—3. *Stigmas not tufted.* Leaves lanceolate, cordate, oblong, or sagittate.

* *Stems twining*, 2—5 feet long. Leaves cordate arrow-shaped. Flowers greenish-white, in loose lateral clusters. Stamens generally eight. Stigmas three. Fruit triangular.

Segments of the perianth bluntly keeled. Stem angular. Fruit not shining, striated with minute points. 23. TWINING CORNFIELD PERSICARIA.

Segments of the perianth with membranous wings. Stem striated. Fruit smooth and shining. 24. TWINING GROVE PERSICARIA.

** *Stems not twining.*

Flowers axillary, 2—3 together, variegated with crimson, white, and green. Stems much branched, full of small knots, 6—30 inches long, more or less procumbent (in rich soil nearly erect), and leafy for their whole length. Leaves lanceolate or elliptical. Stipules chaffy. Stamens eight. Styles three. Fruit triangular.

Fruit shorter than the perianth, wrinkled, or covered with raised points. Annual. 20. COMMON KNOT-WEED.

Fruit longer than the perianth, very smooth and shining. Perennial. 21. SEASIDE KNOT-WEED.

Flowers in spikes or long-stalked clusters.

1. Stamens not protruded beyond the perianth. Stems 1—2 feet high, branched, with numerous spikes or clusters. Annuals.

Leaves triangular-cordate and petioled. Stem nearly erect. Flowers in loose clusters, variegated with pink, green, and white. Stamens eight. Styles three. 22. BUCKWHEAT.

Leaves oblong or lanceolate. Stamens usually six. Spikes terminal and lateral.

Spikes dense, cylindrical, 1—2 inches long. Leaves nearly sessile, glabrous or sometimes downy, often with a large black spot. Fruit flattened.

Ocrea fringed. Pedicels and perianth smooth. Flowers usually pink.
14. COMMON RED PERSICARIA.

Ocrea not fringed. Pedicels and perianth rough with glands. Stem often speckled. Flowers usually greenish.
15. DOCK-LEAVED PERSICARIA.

Spikes thin and slender, 2—5 inches long.

Spikes drooping, greenish; flowers glandular. Leaves waved. Styles cloven half-way down. Taste usually very acrid. 16. WATER-PEPPER.

Spikes upright, reddish; flowers without glands. Leaves flat. Stems creeping at the base. Insipid. 17. SMALL RED PERSICARIA.

(*Stems not twining.* Flowers in spikes.)

2. Stamens much protruded beyond the perianth. Leaves oblong or lanceolate, the lower ones with long petioles. Stems without branches, or nearly so. Spikes of flowers usually solitary. Perennials.

Lower portion of the spike covered with small red bulbs. Flowers white or cream-colour. Stems 4—8 inches high. Leaves linear-lanceolate, the margins of the lower ones revolute. Stamens eight. Styles three. Fruit triangular, rarely ripened. 10. VIVIPAROUS ALPINE PERSICARIA.

No bulbs upon the spike. Leaves oblong. Flowers pink.

a. Blade of the leaf continued down the sides of the petiole. Root-leaves on long petioles; upper ones sessile or nearly so, and all glabrous. Stems 15—30 inches high, erect and quite simple. Spike dense and cylindrical. Stamens eight. Styles three. Fruit triangular. Plant always on dry land. 18. BISTORT.

b. Blade of the leaf not decurrent. Leaves rough at the margins. Stamens five. Styles mostly two. Fruit flattened.

Plant floating in water. 13. AMPHIBIOUS PERSICARIA.

Plant erect, on dry land; leaves rough on both sides with short rigid hairs. 13. AMPHIBIOUS PERSICARIA.

HABITATS AND DISTRIBUTION.

1. CHANGEABLE DOCK—*Ru'mex sanguin'eus.*

Two states of this plant occur, one bright green, very commonly on ditch-banks and in shady places; the other with the veins of the leaves of a rich crimson colour, rather rarely. Fl. July.

E. B. xxii. 1533.

2. ACUTE-LEAVED DOCK—*Ru'mex acu'tus.*

Ditch-banks, low wet meadows, and shady places, where somewhat watery; frequent. Fl. July.

Curtis, i. 166; E. B. xi. 724.

3. DAIRYMAIDS' DOCK—*Ru'mex obtusifo'lius.*

Roadsides and waste places, especially where moist; very common, and usually a rank and troublesome weed. Fl. July, August.

Curtis, i. 167; E. B. xxviii. 1999; Baxter, vi. 454.

This is the species of dock so useful for removing the pain of nettle-stings.

4. GREAT WATER DOCK—*Ru'mex Hydrolap'athum.*

On the banks of rivers and canals; by pond-sides and in marshy places; rather rare. Fl. July, August.

E. B. xxx. 2104 (as *Ru'mex aquat'icus.*)

5. Wave-leaved Dock—*Ru'mex cris'pus.*

Roadsides and waste places; a very common and troublesome weed. Fl. June, July.

Curtis, i. 92; E. B. xxviii. 1998.

A variety with the enlarged perianth-segments unequal and slightly-toothed, and with the leaves broader and less wavy, is by some botanists called *Ru'mex praten'sis* (E. B. Supp. ii. 2757.) Possibly it may be a hybrid between *R. cris'pus* and *R. obtusifo'lius,* from the latter of which it differs in little beyond its more elongated leaves, and the inequality of the enlarged perianth-segments, which are also much dilated at the base.

6. Grainless Dock—*Ru'mex aquat'icus.*

Waste places, where the soil is rich and moist; rare. Chiefly in the north of England and in Scotland. Fl. July, August.

E. B. Supp. ii. 2698.

Possibly a luxuriant variety of the *R. cris'pus.*

7. Fiddle Dock—*Ru'mex pul'cher.*

Dry waste ground and by waysides; in churchyards, &c.; not uncommon. Fl. August.

E. B. xxii. 1576.

8. Yellow Dock—*Ru'mex au'reus.*

Marshes, ditchbanks, and waste watery ground, both inland and near the sea; occasionally in dry fields, the Linnæan specific name *marit'imus* being by no means a correct one. Fl. July, August.

Curtis, i. 168; E. B. xi. 725 (both as *Ru'mex marit'imus.*)

A variety of this plant, found only inland, in habit more luxuriant and slender, with the whorls of flowers further apart, and tawny rather than golden, and with shorter points to the teeth of the enlarged perianth-segments, is distinguished by some botanists as *Ru'mex palus'tris* (E. B. xxvii. 1932.) In Curtis it is confounded with the normal form. The veins of the leaves are sometimes crimson, like those of the red variety of the *Ru'mex sanguin'eus.*

9. Monks' Rhubarb—*Ru'mex alpi'nus.*

Formerly cultivated for the sake of its roots, which were used as a substitute for Turkey rhubarb, and now partially naturalised in many parts of England, especially in the north. Near Manchester, in several places. Apparently wild in Dumbartonshire. Fl. July.

E. B. Supp. ii. 2694.

10. Meadow Sorrel—*Ru'mex Aceto'sa.*

Meadows and pastures, very common; often among mowing-grass, giving the surface a fine crimson tinge. Fl. May, June.

E. B. ii. 127.

Commonly called "green-sauce," and much esteemed for the grateful acidity of its leaves and stalks.

11. SHEEP'S SORREL—*Ru'mex Acetosel'la.*

Dry pastures and hedgebanks; very common. Fl. May—July.

Curtis, ii. 321; E. B. xxiv. 1674.

The stalks and leaves often turn bright red in the decline of the year.

12. MOUNTAIN SORREL—*Oxy'ria renifor'mis.*

On the mountains of the north of England, Wales, and Scotland, growing in moist clefts of rocks, by rills, and in wet and boggy places; common. Scawfell. Fl. June.

E. B. xiii. 910 (as *Ru'mex digy'nus*); Baxter, iv. 311.

13. AMPHIBIOUS PERSICARIA—*Polyg'onum amphib'ium.*

Still rivers, ponds, and lakes: common; covering them, when plentiful, with floating islands of green, above which the cones of pink flowers rise 4—5 inches high. As a terrestrial plant, chiefly near river-margins, and on ground liable to be overflowed, but seldom found in bloom. Fl. July—September.

Curtis, ii. 248; E. B. vii. 436.

No English plant so well deserves the name of "amphibious." In September, 1857, I saw it growing five feet high, in a dry hedge by the roadside between Southshore and Marton, its rosy cones intermingled with ripening blackberries, the water-plant forsaking its native element for high life, and bringing to mind Ovid's famous description of the Deluge:—"Fishes are caught among the elm-trees; dolphins get into the woods; they swim amid the boughs, and smite the sturdy oaks," (Met. i. 296.)

14. COMMON RED PERSICARIA—*Polyg'onum Persica'ria.*

Moist waste places, especially such as are subject to be flooded; upon roadside heaps, and on the borders of cornfields; abundant everywhere. Fl. July—October. Annual.

Curtis, i. 23; E. B. xi. 756.

15. DOCK-LEAVED PERSICARIA—*Polyg'onum lapathifo'lium.*

Waste ground, and in ploughed fields; common, especially where rich and moist, and among potatoes. Fl. August—October. Annual.

Curtis, i. 24 and 25 (as *P. Pensylva'nicum*); E. B. xx. 1382.

The leaves both of this and the preceding species are frequently marked in the centre with a large purple spot. There is a variety with the stems of a deep red colour, and another in which they are speckled.

Intermediate between them is a not uncommon plant called *P. lax'um*, (E. B. Supp. iii. 2822.) agreeing with the *Persica'ria* in all characters except those of the peduncles, which parts are glandular, as in the *lapathifo'lium*. Some suppose it a hybrid, but more probably all three forms represent a single species, of which the *Persica'ria* and the *lapathifo'lium* are developments in contrary directions.

16. WATER-PEPPER—*Polyg'onum Hydropi'per.*

Ditches and watery places; in profusion everywhere. Fl. August—October. Annual.

Curtis, i. 26; E. B. xiv. 989.

Usually of a very hot and biting taste.

17. SMALL RED PERSICARIA—*Polyg'onum mi'nus.*

Ditch-banks and marshy places; rather uncommon. Fl. Sept. Annual.

Curtis, i. 28; E. B. xv. 1043.

Polyg'onum mi'te (E. B. Supp. iii. 2867.) holds the same position with regard to *P. mi'nus* and *P. Hydropi'per* that *P. lax'um* does with regard to *P. Persica'ria* and *P. lapathifo'lium.* It is larger in all its parts than *P. mi'nus,* and has the non-glandular flowers of the *Hydropi'per.* It seems not improbable that 14, 15, 16, and 17 may all be derivations from a single type.

18. BISTORT—*Polyg'onum Bistor'ta.*

Moist rich meadows; also in damp woods and cloughs; common. Very abundant near Manchester. Fl. May, June.

Curtis, i. 22; E. B. viii. 509; Baxter, i. 5.

One of the prettiest of our native plants, and very conspicuous from its erect habit of growth, and the fine contrast of its rose-coloured spikes with the surrounding grasses. The leaves, boiled like spinach, make an excellent dinner-vegetable.

19. VIVIPAROUS ALPINE PERSICARIA—*Polyg'onum vivip'arum.*

Pastures and moist fissures of rocks upon the mountains of the north of England and Scotland. Common in the Highlands. Fl. June, July.

Curtis, iii. 486; E. B. x. 669.

Occasionally in curious gardens.

20. COMMON KNOT-WEED—*Polyg'onum avicula're.*

Everywhere, as a weed, in waste and cultivated ground, flourishing greatly among corn and other farm-crops. Fl. August—Oct. Annual.

Curtis, i. 27; E. B. xviii. 1252.

An extremely variable plant, especially in the size of the leaves. The innumerable slender branches are generally procumbent; but when growing among cereals, or with similar support, they become erect, and are then 2 feet high.

By the seaside it becomes robust and has larger fruit, in which condition it is sometimes called *Polyg'onum littora'le.*

21. SEASIDE KNOT-WEED—*Polyg'onum marit'imum.*

Dry waste places and sandy ground near the sea; not uncommon. Fl. August, September.

E. B. Supp. iii. 2804.

The *Polyg'onum Rai'i* or *Rober'ti,* (E. B. Supp. iii. 2805.) a large and straggling maritime plant, not uncommon on the shores of the west of England and further north, appears to be specifically identical with the *P. marit'imum,* the fruit being glossy, although shorter than the perianth. Some botanists consider the *marit'imum* only a variety of the *avicula're.* If it be so, *P. Rober'ti* is the connecting link.

22. BUCKWHEAT—*Polyg'onum Fagopy'rum.*

Often among vetches sown as a crop, and occasionally in cultivated land, as a relic or descendant of plants similarly introduced. Frequently sown for the use of game. Fl. July—September. Annual.

E. B. xv. 1044.

The plant which yields the well-known "buckwheat flour," so valuable in northern latitudes.

23. TWINING CORNFIELD PERSICARIA—*Polyg'onum Convol'vulus.*

Hedges and cornfields; common everywhere. When among grain, it binds the straws together, as if with string, constituting one of the most mischievous kinds of "tares." Fl. July—September. Annual.

Curtis. ii. 249; E. B. xiv. 941.

24. TWINING GROVE PERSICARIA—*Polyg'onum dumeto'rum.*

Woods and thickets; very rare. Wimbledon, Surrey. Near Keynsham, Somersetshire. Fl. August, September. Annual.

E. B. Supp. ii. 2811.

The cultivated Polygona'ceæ comprise both culinary and ornamental plants. Foremost among the former is the invaluable rhubarb-plant, of which there are three or four distinct species. The most frequent is the *Rhe'um Rhapon'ticum* or Tart-rhubarb, so handsome when its vast cream-coloured panicles open their countless flowers, bulging out of curious sheaths. *Rhe'um undula'tum*, *Rhe'um Emo'di* or Himalayan rhubarb, and *Rhe'um compac'tum*, are also grown for the market. Druggists' or "Turkey rhubarb" is the root probably of *Rhe'um palma'tum*. Culinary or "French" sorrel is *Ru'mex scuta'tus.*

In the flower-garden the most popular is the fine old-fashioned "Persicaria," or *Polyg'onum Orienta'le*, rising six feet high, and throwing out abundance of crimson or white racemes. *Polyg'onum vacciniifo'lium* is a beautiful little species for a rockery. *Eriog'onum* is a pretty North American genus. *Atraphax'is spino'sa* is equally rare and elegant. *Tragopy'rum lanceola'tum* and *T. buxifo'lium* (Bot. Mag. xxvii. 1065, as *Polyg'onum cris'pulum)* are extremely interesting and beautiful little undershrubs.

LVIII. THE MARVEL-OF-PERU FAMILY.—*Nyctagina'ceæ.*

A little family of obscure and weedy herbaceous plants, with a few shrubs and trees, natives of all the warmer parts of the world, though not extending much beyond them. They are closely allied to the Spinach and Amaranth Families, but differ from both in the curious conditions of the perianth and the fruit. The perianth, as the seed approaches ripeness, hardens into a bony shell, which serves as a pericarp, the genuine envelope of the seed being nothing more than a thin membrane. The seeds are remarkably albuminous, appearing as if composed of white flour, and the stems are frequently jointed, like those of geraniums. The best-known ornamental representatives are the annuals called

Marvel-of-Peru, which are species of *Mirab'ilis*. The oldest is *Mirab'ilis Jala'pa* (Bot. Mag. xi. 371.) The blossoms of the *Mirab'ilis dichot'oma* are of many different colours upon the same stem. They seldom expand earlier than four o'clock in the afternoon, from which circumstance the plant has been named Four-o'clock-flower; and being of great beauty under the light of lamps, is by the French called *Belle-de-nuit*. When cultivated in large pots, few plants are better adapted for the decoration of saloons during evening assemblies. Another very pretty genus of annuals belonging to this family is called *Abro'nia*. The *Bugainvil'lea specio'sa* and *B. spectab'ilis* are magnificent greenhouse climbing-plants.

LIX. THE SPINACH FAMILY.—*Chenopodia'ceæ*.

Herbaceous and under-shrubby plants, weedy in habit, 3 inches to 3 feet high, closely resembling the Amaranth-family in structure, but seldom aspiring to their beauty. The flowers, which are almost always green, minute, and insignificant, consist only of calyx, and are generally five-lobed and regular; the normal number of stamens is five, but sometimes there are only two, and occasionally the number is reduced to *one*. The ovary is solitary, and contains a solitary seed. Some species are unisexual. The inflorescence generally forms axillary or terminal spikes or panicles. The leaves are simple, alternate, and exstipulate, and conspicuous, in many instances, from their disposition to assume a triangular outline, and to be covered, as well as the stems, with a whitish and unctuous scurf. Some species, instead of a perianth, have for the female flowers only bracts, which, as the seed ripens, become extended into broad flat wings, of very odd appearance. Others secrete abundance of red juice in the perianth-tissue, the number and closeness of the flowers making the stalks appear clothed with sessile strawberries. This is particularly observable in the strawberry-blite, or *Bli'tum virga'tum* (Bot. Mag. viii. 276.) The perianth is always persistent, and usually closes over the fruit. The plants called *Salicor'nia* have no leaves.

Chenopods are exceedingly common in all the northern parts of Europe and Asia, and in several cases supply wholesome articles of food, as spinach, in its leaves; the celebrated Quinoa of Peru; (*Chenopo'dium Qui'noa*, Bot. Mag. lxv. 3641.) and the beet, in its great red root, famous as the principal source of sugar to the French. Carbonate of soda, in the crude condition called Barilla, is yielded in immense quantities by the seaside-haunting species, which are numerous; and a few are accounted serviceable as medicines.

Nineteen species, with many varieties, grow wild in Britain.

A.

Stems leafy, not jointed, and much branched.

1. *Leaves awl-shaped, semi-cylindrical, as thick as broad,* ½—1 inch long. Flowers axillary, sessile, and solitary. Stamens five.

    a. Leaves terminating in sharp thorns. Stems diffuse, angular, rigid. Flowers with three bracts at the base. Perianth deeply five-cleft. Plant dark-green. 12. Prickly Glass-wort.

    b. Leaves not thorny.

    Leaves acute. Stem herbaceous, erect or procumbent, straggling. Styles two. 10. Common Sea-goosefoot.

    Leaves obtuse. Stem shrubby, erect, 2—3 feet high. Styles three. 11. Shrubby Sea-goosefoot.

2. *Leaves flat.* Flowers almost invariably unisexual and monœcious; the stameniferous ones with a 3—5-cleft perianth, and pentandrous; the pistilliferous ones usually consisting of nothing more than 2—3 flat bracts, a solitary ovary, and two sessile stigmas. *Bracts much enlarging as the fruit ripens, so as to become conspicuous wings,* like the two great outer sepals of the Polygala.

    Shrubby and perennial. Stem 1—3 feet high. Leaves obovate, lanceolate, entire, silvery-white or silvery-gray. Flowers yellowish-white, in axillary spikes. 15. Shrubby Orache.

    Herbaceous annuals.

    a. Enlarged bracts united nearly to the summit. Flowers on long peduncles, wedge-shaped and two-horned. Stem zigzag, with spreading branches. Leaves obovate, lanceolate. Whole plant covered with scaly mealiness.

    16. Stalked Sea Orache.

    b. Enlarged bracts thin, and quite unconnected. Stems erect. Leaves triangular, heart-shaped, wavy, or toothed, shining on the upper surface, glaucous beneath.

    18. Garden Orache.

    c. Enlarged bracts united from the base to the middle, hard and thick.

    Pistilliferous flowers mostly in the axils of the nearly-sessile upper leaves, the enlarged bracts *white and scaly.* Stameniferous flowers in panicles formed of compact little spikes. Whole plant hoary with white and scaly meal. Leaves usually triangular or rhomboid.

    17. Frosted Sea Orache.

    Stameniferous and pistilliferous flowers mostly mingled in slender spikes, which are collected into narrow, leafy and terminal panicles, the enlarged bracts *green,* or only slightly mealy, and more or less warty. Plant ordinarily dull green. Lower leaves usually hastate.

    19. Common Orache.

3. *Leaves flat*, triangular-ovate, fleshy, glossy, and flaccid; lower ones 3—4 inches long; upper ones vertical. Stems many, prostrate at first, then rising 6—24 inches high. Spikes long, simple or branched, and leafy; flowers almost always bisexual, mostly in pairs, with three lanceolate bracts; the perianth five-cleft and persistent, *the thickened base having the fruit completely embedded in it.* Stamens and styles 2—3. 14. Wild Beet.

4. *Leaves flat.* Flowers almost always bisexual. Perianth 3—5-cleft, uniform, *not materially enlarging as the fruit ripens*, but forming a thin, persistent, and free cover to it. No bracts. Stamens usually five. Stigmas 2—3.

* *Perennial.* Stem 12—18 inches high. Leaves large, broadly triangular, pointed, mostly entire, dark-green. Spikes of flowers erect, terminal and axillary, compound and leafless. 1. Perennial Goosefoot.

** *Annual. Leaves undivided, all quite entire.* Fruit horizontal.

a. Plant covered with a greasy, pellucid, and whitish meal, and yielding a detestably-nauseous smell when rubbed or crushed. Leaves small, ovate, fleshy, and petiolate. Flowers densely-clustered in the upper axils. 7. Fœtid Goosefoot.

b. Plant green or reddish, and scentless.

Stems mostly procumbent, roundish, 12—18 inches long. Leaves ovate-elliptical, obtuse, 1½—2 inches long, on short petioles. Clusters of flowers sub-cymose, leafless or nearly so. Fruits very numerous, dark reddish-brown, shining, and conspicuous. 5. All-seed Goosefoot.

Stems nearly erect.

Leaves ovate, acute. Stems nearly square. 5β. *acutifo'lium.*

Lower leaves ovate, angular or sinuate. 2β. *vir'ide.*

⁂ *Annual. Leaves, or at least the lower ones, toothed, angular, sinuate or lobed.*

a. Plant (especially the flowers and the under-surfaces of the leaves) more or less white with mealy and unctuous pubescence, which in age becomes dry and chaffy.

Fruits all *horizontal.*

Spikes of flowers dense and leafy. Upper leaves narrow and entire, whitish on both surfaces. Plant 1—3 feet high, scentless. Perianth completely closing over the fruit. 2. White Goosefoot.

Spikes of flowers leafless or nearly so. Plant 12—18 inches high; fœtid. Perianth almost closing over the fruit. 8. Nettle-leaved Goosefoot.

Fruits mostly *erect*, very minute, and nearly concealed by the 3—5-cleft perianth. Stamens 1—3. Leaves all sinuate, green or purplish above, white underneath, the teeth unusually regular. Spikes mostly axillary, and nearly leafless. 6. Oak-leaved Goosefoot.

STEMS LEAFY. *Leaves flat.* Annual. Leaves, or at least the lower ones, toothed, angular, sinuate, or lobed.)

b. Plant green or reddish, (especially when near the sea) not mealy.

Lower leaves broadly heart-shaped at the base, with 2—4 large angles upon each side. Plant bright-green, fœtid. Flowers chiefly in a divaricated and leafless panicle. Perianth not concealing the very large and horizontal fruit.
9. STRAMONIUM-LEAVED GOOSEFOOT.

Lower leaves narrowed at the base into a petiole. Flowers chiefly in axillary clusters, or in a short, terminal, leafy panicle.

Axillary spikes perfectly erect. Leaves glossy, deeply and irregularly toothed, 2—3 inches long. Smell of plant disagreeable.

Fruits nearly as large as rape-seed, and *horizontal.* Flowers scattered on the long and nearly leafless spikes, which are more or less appressed.
3. UPRIGHT GOOSEFOOT.

Fruits not larger than sea-sand, and mostly *erect.* Flowers crowded on the leafy and rather spreading spikes. Perianth 2—4 cleft. Stamens 1—2. 4. RED GOOSEFOOT.

Axillary clusters collected into short, dense, leafless cymes or panicles, so as to look flat or depressed, with the tips a little incurved. Smell unpleasant.
8. NETTLE-LEAVED GOOSEFOOT.

Plant scentless. Leaves petiolate. 2*β. vir'ide.*

B.

STEMS LEAFLESS, succulent, branched, composed of a number of cylindrical and fleshy joints the thickness of a quill, and an inch or two in length, every joint fitting into the one below; usually erect, sometimes procumbent, and then occasionally creeping, the maximum height 12 inches. Flowers green and inconspicuous, produced three together, in a triangle, between every two joints of the terminal branches. Stamens 1—3; style very short; stigma cleft. 13. COMMON SALTWORT.

HABITATS AND DISTRIBUTION.

1. PERENNIAL GOOSEFOOT—*Chenopo'dium Bonus-Henri'cus.*

Waste places, sides of lanes near old farm-houses, under walls of churchyards, &c., but not very common, and in many instances probably a descendant of cultivation, having formerly been esteemed as a culinary vegetable. Fl. May—August.

Curtis, i. 162; E. B. xv. 1033.

2. WHITE GOOSEFOOT—*Chenopo'dium al'bum.*

Abundant on waste and cultivated land, especially on the borders of potato and turnip fields; a quick-growing and troublesome weed, indicative of good soil. Fl. August. Annual.

Curtis, i. 87; E. B. xxiv. 1723.

A variety with greener, narrower, and less serrate leaves, and the spikes more lax, called by Linnæus, *Chenopo'dium vir'ide*, is tolerably common. Another variety, rather rare, with dotted instead of smooth fruit, and the stem remarkably red near the joints, has been named *Chenopo'dium ficifo'lium* (E. B. xxiv. 1724.) This last is the *C. vir'ide* of Curtis (i. 88.)

3. Upright Goosefoot—*Chenopo'dium ur'bicum.*

Waste places, often near farm-houses, and in lanes near farm-buildings, especially where the ground has lain under water during the winter. Fl. July, August. Annual.

E. B. x. 717.

4. Red Goosefoot—*Chenopo'dium ru'brum.*

Waste places, on rubbish-heaps, and under walls, especially near the sea. Common, except in the northern half of Scotland. Fl. August, September. Annual.

E. B. xxiv. 1721.

A maritime variety, with the leaves attenuated at the base, and scarcely toothed, has been named *Chenopo'dium Botryoi'des* (E. B. xxxii. 2247.)

5. All-seed Goosefoot—*Chenopo'dium polysper'mum.*

Waste and cultivated ground in the midland and southern counties; rather uncommon. Fl. August—October. Annual.

Curtis, i. 89; E. B. xxi. 1480.

When, as sometimes happens, the leaves are acute, this plant becomes the *Chenopo'dium acutifo'lium* of E. B. xxi. 1481, and the *C. polysper'mum* of Curtis, i. 89.

6. Oak-leaved Goosefoot—*Chenopo'dium glau'cum.*

Waste and cultivated land in many parts of England, but not yet observed in either Scotland or Ireland. Fl. August, September. Annual.

E. B. xxi. 1454.

7. Fœtid Goosefoot—*Chenopo'dium ol'idum.*

Waste and rubbishy places; upon heaps of manure and canal-scrapings, &c.; not very common. Sometimes as a garden weed. Fl. July—September. Annual.

Curtis, ii. 312; E. B. xv. 1034.

8. Nettle-leaved Goosefoot—*Chenopo'dium mura'le.*

In similar situations, but rather uncommon, and not found in Scotland. Fl. August, September. Annual.

Curtis, ii. 384; E. B. xxiv. 1722.

9. Stramonium-leaved Goosefoot—*Chenopo'dium hyb'ridum.*

Ploughed fields and waste places, where moist; rare. Chiefly in the south-east of England. Fl. August, September. Annual.

Curtis, ii. 240; E. B. xxvii. 1919; Baxter, v. 352.

The name *hyb'ridum*, as in several other cases, is improperly applied.

10. Common Sea-Goosefoot—*Suæ'da marit'ima.*

Sandy and muddy sea-coasts; common all round the British Isles. Fl. July, August. Annual.

E. B. ix. 633 (as *Chenopo'dium marit'imum.)*

11. Shrubby Sea-Goosefoot—*Suæ'da frutico'sa.*

In similar situations, but rare, being confined to the southern, south-western, and eastern coasts. Fl. autumn.

E. B. ix. 635 (as *Salso'la frutico'sa.)*

12. Prickly Glass-wort—*Salso'la Ka'li.*

On the sea-shore, among the sand and pebbles just above high-water mark. Common, except in the more northern parts of Scotland. Fl. July, August. Annual.

Curtis, iv. 596.; E. B. ix. 634; Baxter, iv. 255.

13. Common Salt-wort—*Salicor'nia herba'cea.*

Sea-shore, in salt and muddy places, where liable to be overflowed by the tide; very common: also in salt-marshes that are frequently inundated. Fl. late in summer. Annual; sometimes perennial.

A variable plant, formerly distinguished into four "species," viz.:—

Salicor'nia an'nua,—the simplest form, annual, and with the stem and scanty branches both erect. (E. B. vi. 415; Baxter, iv. 307, as *Salicor'nia herba'cea.*) Abundant on mud-flats, often covering many acres.

Salicor'nia procum'bens,—the same, with the stems procumbent, and two stamens, one appearing earlier than the other. (E. B. xxxiv. 2475.)

Salicor'nia rad'icans,—the stem woody, procumbent, rooting, and perennial; stamens two. (E. B. xxiv. 1691.) Rare.

Salicor'nia frutico'sa.—Perennial. (E. B. xxxiv. 2467.)

14. Wild Beet—*Be'ta marit'ima.*

Muddy sea-coasts; not uncommon. Fl. summer and autumn.

E. B. iv. 285; Baxter, iii. 231.

The original of the garden beet, and of the agricultural plant called *mangel wurzel.*

15. Shrubby Orache—*A'triplex Portulacoi'des.*

Muddy sea-shores; rather uncommon. Fl. July, August.

E. B. iv. 261.

16. Stalked Sea Orache—*A'triplex peduncula'ta.*

Muddy salt-marshes, on the southern and eastern coasts of England. West coast of Ireland. Fl. August, September. Annual.

E. B. iv. 232.

17. Frosted Sea Orache—*A'triplex lacinia'ta.*

Sandy sea-shores; not uncommon. Fl. July, August. Annual.

E. B. iii. 165.

18. Garden Orache—*A'triplex horten'sis.*

A culinary plant, probably from western Asia, and formerly much used as a kind of "greens." Now naturalised in Europe, and said to be tolerably abundant on the sea-coast near Ryde, Isle of Wight. Fl. July—September. Annual.

19. Common Orache—*A'triplex pat'ula.*

Waste ground, everywhere, both inland and upon the sea-shore; in cultivated ground a common and disagreeable weed, flowering at the end of summer, and conspicuously laden in autumn with the enlarged and dull-green bracts that shelter the fruit. Annual.

Curtis, i. 139 (as *A'triplex hasta'ta*); E. B. xiii. 936; Baxter, v. 356.

The common Orache is one of the most protean of our native plants. Seven or eight inland forms have been distinguished and named as "species," and every one of them appears to have a maritime sub-variety. Some of these are figured in E. B., viz.:—*A'triplex littora'lis,* (xi. 708.) *A'triplex angustifo'lia,* (xxv. 1774.) *A'triplex erec'ta,* (xxxii. 2223.) *A'triplex deltoi'dea,* (Supp. iii. 2860.) and *A'triplex ro'sea* (Supp. iii. 2880.) The two last have been observed only in the Channel Islands. The reputed characters of the whole may be found in Mr. Babington's "Manual," wherein are also described *A'triplex mari'na, microsper'ma,* &c., resolvable, like the above, into the original *pat'ula,* which name is the only necessary one for the whole of the British inland Atri'plices. In its most usual condition, orache is remarkable in having the central stem erect, while the long, straggling, and furrowed branches look as if they had been forcibly bent downwards, and were unable to rise up again. The whole plant is often tinged with red, and the upper leaves are usually undivided.

Scarcely anything of value for the flower-garden is furnished by the Chenopods. The best of the ornamental species is the strawberry-blite, already named. *Basel'la lu'cida,* a tender annual from the East Indies, is interesting when in fruit. *Cheno'lea diffu'sa,* from the Cape of Good Hope, is a pretty little plant with silvery foliage. *Boussingault'ia Baselloi'des,* (Bot. Mag. lxiv. 3620.) a plant from Buenos Ayres, with long, slender, and copious racemes of fragrant white flowers, is well adapted for the conservatory. *Chenopo'dium Atri'plicis* has handsome red clusters like those of the spicate celosias. *Chenopo'dium Scopa'ria* was esteemed in old floriculture under the name of Belvedere or "Summer-cypress." Purple orache, a variety of the *A'triplex horten'sis,* is a showy, though gaunt and coarse plant, rising 4—5 feet high, and in autumn a useful contrast for evergreens in the fine red of the stems and fructification.

LX. THE BEAN-CAPER FAMILY.—*Zygophylla'ceæ.*

Herbaceous plants, shrubs and trees, widely scattered over the warm and tropical parts of the world, and extending as far as the south of Europe. In England they are rarely seen, except in one or two species of the typical genus, and one or two more of the Honey-flower or *Melian'thus.* The structure of the blossoms corresponds with that found in the *Ruta'ceæ,* from which family the present one is differentiated by the pericarp not separating into layers. The species are remarkable in the alliance to which both families belong, for their opposite leaves and conspicuous stipules, and are further distinguished from the *Ruta'ceæ* in particular by the absence of translucent resinous dots. The softness of the stems of the herbaceous species makes still more remarkable the extreme hardness of the wood furnished by the arborescent kinds, a familiar example of which occurs in the lignum-vitæ, or *Guai'acum officina'le,* (Bot. Reg. N. S. ii. 9.) a wood remarkable also for the direction of its fibres, one layer of which often crosses another diagonally. The commonest species in cultivation is the Syrian Bean-caper or *Zygophyl'lum Faba'go,* an herbaceous plant with binate leaves, and inconspicuous orange and white blossoms, having ten stamens and a solitary ovary. *Zygophyl'lum insua've* from the Cape of Good Hope (Bot. Mag. ii. 372.) is similar in foliage, but with larger and handsomer flowers. Unfortunately it has a very disagreeable odour, resembling that of foxes. The Honey-flowers are common, especially *Melian'thus mi'nor,* (Bot. Mag. ix. 301.) but are seldom seen in bloom, a circumstance their anomalous character renders regretful. The various species of *Trib'ulus* have golden blossoms not unlike those of a little cistus.

LXI. THE PEPPER FAMILY.—*Pipera'ceæ.*

The invaluable plants which supply our cruet-stands with black and white pepper are in this association far more interesting than in any particulars purely botanical. They are in all cases either herbaceous plants or small shrubs, and are so similar in appearance, and so insignificant in their flowers, as to be generally disregarded by cultivators. The herbaceous species, commonly called *Pepero'mias,* are mere weeds. No true peppers have yet been detected beyond the tropics, though in the northern temperate zone the family is represented by the allied genus *Sauru'rus.* The flowers, which are of the simplest structure, bear some resemblance to those of the *Chenopodia'ceæ,* and are borne in very long, green, slender and attenuated spikes, resembling the tails of lizards or little mammals. The leaves are simple and undivided. Black and white pepper are the produce of *Pi'per ni'grum,* the latter differing only in having had the husk removed. "Long pepper" consists of the female spikes of the *Chavi'ca Roxburgh'ii.* "Cubebs" are the produce of *Cube'ba officina'lis.*

GROUP II.—OVARY FREE AND ENCLOSED WITHIN THE PERIANTH; STAMENS UPON THE CALYX OR THE COROLLA.

LXII. THE MEZEREON FAMILY.—*Thymela'ceæ.*

Shrubs, usually of inconsiderable stature, but with flowers recommended by their tender loveliness, early appearance, or delicious odour. Leaves simple, undivided, entire, exstipulate, and often evergreen. Perianth single, tubular, mostly regular, usually four-cleft, but occasionally pentamerous; red, pink, white, yellow, or yellowish-green, and often downy or hairy upon the outside. Stamens, in the tetramerous species, two, four, or eight; in the pentamerous species, ten; the anthers sessile in the tube of the perianth, and half of them, when of the superior numbers, higher up than the remainder. Ovary solitary and one-celled; stigma capitate, and almost sessile; fruit either hard and dry, or drupaceous and juicy. An involucrum of large and handsome bracts not infrequently surrounds the flowers when they grow in heads, which in this family is a very common occurrence.

About three hundred species are known, natives principally of Australia and the Cape of Good Hope, though many belong to the colder parts of India and South America. In Europe they occur but sparingly. They are remarkable for the stringiness and the toughness of their bark, and no less so for the caustic properties of the same part, which supplies, in different kinds, materials for paper and fine cordage, and substances available for use in medicine as irritants. The celebrated lace-bark tree, or *Laget'ta lintea'ria*, of the West Indies, is foremost in the first respect, and the common red mezereon in the second. Every part of this well-known shrub is excessively acrid, and acts as a local poison. Birds, however, eat the fruit with impunity.

Two species grow wild in Britain, both with tetramerous flowers and eight stamens.

1. A shrub 2—3 feet high, with numerous, nearly erect, flexible, and nearly naked branches, which towards the summits are crowded with lanceolate and evergreen leaves, 2—3 inches long, and bearing in their axils small clusters of greenish-yellow flowers, each of which is accompanied by an oval and concave bract. Drupes ovate and blueish-black. Flowers fragrant in mild weather, and especially towards night. SPURGE LAUREL.
2. A shrub 2—3 feet high, with numerous and nearly erect branches. Flowers appearing in early spring, before the leaves come out, very numerous, scattered over the former year's wood for a space of 3—15 inches below the leaf-buds, sessile, fragrant, deep-red, rosy-pink, or cream-colour. Leaves in May, numerous and lanceolate. Drupes red. MEZEREON.

HABITATS AND DISTRIBUTION.

1. Spurge laurel—*Daph'ne Laure'ola.*

Woods and hedgerows, especially upon clay and stiff soil; not uncommon. Doubtfully wild in Scotland, and not hitherto observed in Ireland. Fl. March, April.

Curtis, iv. 607; E. B. iii. 119.

Common in gardens and plantations, where it often flowers again in October.

2. Mezereon—*Daph'ne Meze'reum.*

Woods in some parts of the south of England; rare. Fl. Jan.—March.

E. B. xx. 1381; Baxter, ii. 96.

Universal in gardens, where also is found a variety that reserves its blossoms till the autumn.

Besides these two, not many Thymelaceæ are cultivated out of doors. The prettiest is the trailing Daphne, or *Daph'ne Cneo'rum*, (Bot. Mag. ix. 313.) a little alpine shrub with lanceolate leaves and umbellate heads of crimson and highly-fragrant flowers, produced in early summer, and often again in September. *Daph'ne Tarton-rai'ra* is remarkable for the silkiness of its foliage, and the white appearance of the whole plant, which is weak and irregularly-branched. The leaves are very small, and the flowers insignificant and yellowish. Under glass, or half-hardy, according to the latitude, there are Daphnes that surpass even the mezereon in delightful odour, as *Daph'ne hyb'rida, Daph'ne Pon'tica*, (Bot. Mag. xxxi. 1282.) and *Daph'ne odo'ra*, (Bot. Mag. xxxviii. 1587.) the last-named from China. The pride of the family, as regards the green-house, lies in the Pimeleas of New Holland. These lovely plants produce abundance of slender branches, 2—4 feet high, every branch bearing an umbel of innumerable pink or white and diandrous flowers, the tube hairy and very slender, and the mouth four-cleft. Below the umbels are numerous large and lanceolate bracteas. The other representatives of the family usually met with, comprise many species of *Gnid'ia*, such as the yellow-flowered *Gnid'ia sim'plex;* (Bot. Mag. xxi. 812.) *Struthi'olas;* (Bot. Mag. xxx. 1212.) *Passeri'nas;* (Bot. Mag. ix. 292, xlv. 1949.) *Lachnæ'as*, distinguished by their slightly irregular flowers, and leaves in four vertical ranks, as in *L. purpu'rea;* (Bot. Mag. xxxix. 1594.) and the decandrous *Da'is cotinifo'lia*, (Bot. Mag. v. 147.) a flower not unlike the *Pen'tas car'nea* of the coffee-tree family. All these are from the Cape of Good Hope.

LXIII. THE PROTEA FAMILY.—*Protea'ceæ.*

Shrubs and large trees, ornamenting New Holland and the Cape of Good Hope with some of their finest and most remarkable vegetation. Several hundred species have been named, and of these probably one-half are met with in conservatories, where the neatness of their appearance, and the oddity of their foliage and inflorescence, cause them to be much prized. The leaves are evergreen, usually hard and dry, simple and entire, or variously serrated or pinnatifid; the flowers are irregular and tetramerous, and consist of a tubular calyx only, with four stamens and a solitary ovary, the style arising from which often projects like a horn, and becomes the most conspicuous part of the blossom. Sometimes the flowers grow in light clusters, as in the *Grevil'leas;* sometimes they are crowded into magnificent heads, with immense and splendid bracteas, in form like those of artichokes, as in many of the superb genus *Pro'tea;* in the *Banks'ias* they are so piled up as to form cylindrical and bristling spikes nearly a foot in length. The fruits include some of the most extraordinary in nature. The capsule of the *Xylome'lon pyrifor'me* of New South Wales, is aptly designated the "wooden-pear;" the fruits of the genus *Ha'kea* are "wooden-cherries;" those of the Banksias resemble a number of bivalve shells of the *Tel'lina* or *Mac'tra* kind, embedded horizontally, with their mouths outwards and a little open, in a club-shaped column or knob of wood. A happier name than that of the old sea-pantomimist could not have been bestowed on this wonderful race, which, in admirable variety, is without parallel.

The peculiarities, both of foliage and inflorescence, are well expressed in the following species:—*Pro'tea Cynaroi'des;* (Bot. Mag. xx. 770.) *Banks'ia ericæfo'lia* and *integrifo'lia;* (Bot. Mag. xix. 738, liv. 2770.) *Ha'kea nit'ida;* (Bot. Mag. xlviii. 2246.) *Grevil'lea seri'cea;* (Bot. Mag. xxii. 862.) and *Dryan'dra longifo'lia* (Bot. Mag. xxxviii. 1582.) The Waratah or *Telo'pea speciosis'sima*, (Bot. Mag. xxviii. 1128.) is a most gorgeous plant. *Rhopa'la Corcovaden'se* has great pinnate leaves, two feet long; *Leucaden'dron argen'teum* is called the "silver-tree," on account of the brilliant whiteness of its silky foliage.

LXIV. THE ICE-PLANT FAMILY.—*Ficoi'deæ* or *Mesembrya'ceæ.*

Low-growing herbaceous plants, frequently procumbent, and remarkable for their extreme succulence and the anomalous forms of their leaves, which are usually so much distended with sappy fluid as to become bags or lumps of green pulp, and are often curiously angular. The petals are numerous, linear, an inch or two in length, and generally of some vivid colour, as crimson or yellow, giving the flowers much the aspect of those of Composites, to which, however, being simple, they have no actual resemblance. The affinities of the family are chiefly with the Cactaceæ, but from these the perigynous stamens keep it distinct; and with no other, unless the *Crassula'ceæ*, in which family succulence also prevails to a great extent, is it possible to confound it. The *Crassula'ceæ* are distinguished by the stamens being placed upon the receptacle, and the petals rarely exceeding five. The *Ficoi'deæ* are further remarkable for the extreme sensitiveness of their blossoms to the influence of light and moisture. No plants are more radiant in the sunshine; yet, on damp and cloudy days, an open flower is not to be seen. Some of the species have hygrometric capsules. Those of the *Mesembryan'themum Tripo'lium* (often miscalled the Rose-of-Jericho, and, still more foolishly, the "Resurrection-flower") are imported from the Cape of Good Hope as curiosities. When dry, they resemble a round gray button about an inch in diameter, but on being dipped in water, they expand into a beautiful star, the rays consisting of the carpels, which then discharge their small black seeds. As the moisture evaporates, the button-form is resumed.

The hot sandy plains of the extreme south of Africa furnish the chief part of this eccentric family, a few species of which are found also in the precincts of the Mediterranean. They are known in England only as inmates of the green-house, except that a few are planted out in the open borders for summer ornament. One of the most showy is the *Mesembryan'themum spectab'ile*, (Bot. Mag. xi 396.) the petals of which are of a fine crimson-purple colour. *M. viridiflo'rum* (Bot. Mag. ix. 326.) has *green* flowers; the cylindrical leaves of *M. den'sum* (Bot. Mag. xiii. 1220.) have tufts of long bristly hairs at the extremity, making them resemble the Hydra or fresh-water polyp; the whole surface of the *M. crystalli'num* and one or two others, called, from their appearance, "Ice-plants," is besprinkled with minute and glittering beads that look like congealed bubbles of water. On the coast of Teneriffe, the ice-plant grows in such abundance as to be collected, with other maritime succulents, for the manufacture of barilla. The flowers of this species are sessile, nearly white, and smaller than usual in the genus.

LXV. THE CALYCANTHUS FAMILY.—*Calycantha'ceæ.*

Shrubs from North America and Japan, allied to the Rosaceæ, but with some singular characters that keep them perfectly distinct. The stems are square, and have four imperfect woody axes surrounding the ordinary central one; the woody tissue is marked with discs extremely like those of the Coniferæ; the leaves are opposite, simple, exstipulate, and scabrous; the flowers axillary and solitary, usually of delicious fragrance, the sepals and petals numerous, alike in colour and texture, and combined into a fleshy tube, which encloses the numerous ovaries. The stamens are numerous, but the inner ones are mostly abortive.

Two of the half-dozen species are not uncommon in gardens, the *Calycan'thus Flor'idus* (Bot. Mag. xiv. 503.) and the Japanese *Chimo-*

nan'thus fra'grans. (Bot. Mag. xiii. 466.) The Calycanthus is a spreading deciduous shrub, 4—5 feet high, with broadly-elliptical leaves, and abundance of deep reddish-brown or lurid purple flowers, an inch or two across, and with the odour of ripe apples or quinces. They are produced from May to August, and bear some resemblance to a double anemone, being formed of numerous lanceolate sepals and petals. The twelve outer stamens alone are perfect. The wood and the leaves have the smell of camphor. The Chimonanthus pours out a profusion of whitish-pink and deliciously fragrant blossoms very early in the spring, the branches being studded with them in the same manner as the mezereon, though less copiously. The leaves, which do not appear till the usual season, are broadly-elliptical and acuminate. Five only of the stamens are perfect.

LXVI. THE BAY-TREE FAMILY.—*Laura'ceæ.*

A noble family of exotic and mostly tropical trees and shrubs, generally fragrant and aromatic, if not in their living substance, in their products, which include cinnamon, cassia, benzoin, camphor, and sassafras. Few members of it can endure the open air in this country; the only common one out of doors is the Bay or *Lau'rus nob'ilis,* the leaves of which, smelling like cinnamon, are so much esteemed for the agreeable flavour they impart to custards and confectionery. Two or three of them are generally found upon the topmost layer when we open a box or drum of Turkey figs. The Bay is an overgrown and irregular shrub, rather than a tree,—for, although it often attains the height of 30 feet, it rarely assumes an arborescent character, always displaying a tendency to throw up suckers around the principal stem. It is immediately distinguished from all other evergreen shrubs by the rich odour of its elliptical and glabrous leaves, and by its green and tetramerous flowers, which are unisexual and diœcious, the males with four stamens, and the females with a solitary pistil. The blossoms appear in May and June, but being small and nearly sessile, they are liable to be overlooked. The Bay is the true and original "laurel," the immortal tree which in all ages has supplied the scented chaplet of the poet; the "*innuba Laurus*" which, according to classic fable, was, in the days of Apollo, the vestal daughter of Peneus, then with swift red blood in her veins instead of sap. The name of laurel should never have been taken away from it, much less applied to a tree with so few points in common as the *Lau'ro-cer'asus.* In severe winters the Bay is often destroyed down to the ground, but possessed of extreme tenacity of life, two years or more after it has seemed to be dead, it will send up new shoots from the stump.

The Sassafras-tree or *Lau'rus Sass'afras*, often grows to the height of 40—50 feet. The leaves are deciduous, with generally 2—3 deep lobes, pale green, and upon long petioles. The greenish-yellow flowers are produced in corymbose racemes, and, like those of the Bay, are diœcious; the berries are oval, bright but deep blue, and contained in small dark-red cups, supported on long red peduncles. It was the strong fragrance of this tree that, perceived by Columbus, encouraged him to proceed, though his crew were in a state of mutiny, and no land broke his flat horizon. There is a good figure of it in Catesby's Carolina, vol. i. pl. 55.

The Benzoin-tree exists in England only as a tender shrub. The leaves are ovate, entire, acute at both extremities, and deciduous. The Camphor-tree (Bot. Mag. liii. 2658.) occurs in green-houses, but not so frequently as the Cinnamon-tree. (Bot. Mag. xl. 1636.) The latter is easily recognised by its large, smooth, oval, three-ribbed, entire, and pointed leaves, and panicles of small white flowers, not unlike those of the white-blossomed Persian lilac.

The essential characters of the family consist in the singleness of the perianth, and the very curious mode in which the anthers burst, as adverted to under *Berberida'ceæ* (p. 185.)

LXVII. THE PEA FAMILY.—*Legumino'sæ* or *Faba'ceæ*.

In the assemblage represented by the Pea the *beau-idéal* of a botanical family is completely realised. Every diversity of size, stature, and configuration occurs in it. At one extreme we have the tender procumbent annual that dies, like Semele, in the embraces of the summer sun; at the other, trees of dimensions so enormous, that in reading of them we almost suspect "travellers' tales," and the age attained by which already exceeds three thousand years.* Every modification of the beautiful and expansive idea of the compound leaf; every variety of racemose and capitular inflorescence, and of habit and physiognomy, has examples in it, and yet there is no family more easily recognised, or in which the original design is more consistently preserved. Under all its myriad changes, it is still plainly and conspicuously the Pea Family. Neither is any family more widely diffused, or of more generally beautiful and inviting appearance. While it glorifies the tropics, it is the festive wreath of cold and temperate climates, (the island of St. Helena alone excepted) and though numbers of its species are of no value for the flower-garden, there are few that can be designated insignificant or worthless. In the breadth of a rich kingdom we always expect a certain amount of desert land; in every family of plants there is a proportion of uninteresting ones; and the Leguminosæ only follow the usual rule as regards the aspect of their very small minority. The variety and extent of their use is as great as the diversity of their features. Dyes, such as indigo and logwood,—fruits, such as the carob and the tamarind,—medicines, such as senna-leaves,—sweet and nourishing vegetables of the kind called pulse, as peas and beans,—gums, including gum-arabic and gum-tragacanth,—wholesome juices, such as liquorice,—perfumes such as that of the Tonquin-bean, are all yielded abundantly by this noble family, which stands among plants like the city of Queen Dido in the days of Æneas—*Carthago, dives opum.* Deleterious species frequently occur abroad, but none are found in England, at least among the wild ones, excepting, perhaps, the *Lath'yrus Aph'aca.* The only common garden species of ill repute in this respect is the Laburnum, the seeds of which are poisonous.

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* See, for particulars respecting the vegetable patriarchs alluded to, "Life, its Nature, Varieties, and Phenomena," chap. viii. Ed 2.

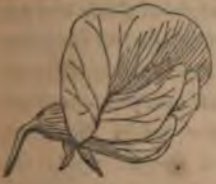

Fig. 106.
Papilionaceous corolla.

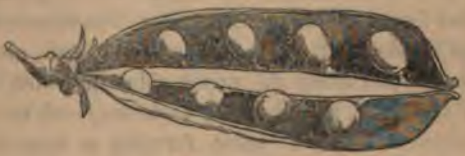

Fig. 107.
Legume opened to show the seeds.

Every species of this great family is determinable by one or other of two simple characters, both of which are quite peculiar to the Leguminosæ,—namely, a "butterfly-shaped" corolla, such as we find on a great scale in the common pea, (Fig. 106.) or a fruit, formed like that of the same plant, and technically called a "legume" (Fig. 107.) By far the larger portion have these two characters combined. It is only in certain tropical and extra-European genera that we find a deviation from either of them, and those in which the fruit is the abnormal part are so exceedingly rare, that in practical English Botany they are of no account. The presence of a legume, or pod formed on the type of the common green-pea, (though sometimes only one-seeded, or twisted, or jointed) is sufficient for the determination of any species ever likely to be seen alive in England; those most unpea-like flowers of all, the

Cassias and the Australian Acacias, acknowledge themselves leguminous when the time comes to ripen their fruit.

The constituent parts of the "butterfly-shaped" corolla, classically called "papilionaceous," are distinguished by special names. The large upper petal, enclosing the others while in bud, and often folding over them at night, is the "standard;" the two lateral and interior petals, which often present a different colour, are the "wings;" the two lowermost and inmost, which cohere by their lower edges into a boat-like cover for the stamens and pistil, and often quite conceal these parts, are the "keel." In the Leguminosæ of the northern hemisphere the papilionaceous corolla is the predominant one. It is also found abundantly in those of the southern; but the Cassias, the Acacias, and other remotely exotic genera, exchange it for a different kind, and sometimes for a minute rosaceous one. When the corolla is rosaceous, the stamens are generally numerous, and the flowers sometimes unisexual. In the Papilionoideæ, on the other hand, there are never more than *ten* stamens. The long filaments of these ten are either free or united by their edges. Sometimes the whole ten combine, edge to edge, for nearly their whole length, and form a sheath (occasionally split along the upper side) in which the ovary is enclosed, the style and stigma being alone exposed to view, as in Fig. 108. Sometimes only nine unite, forming an imperfect sheath, while the tenth stands free and apart (Fig. 109.) If the union be complete, as in the broom and the furze, the stamens are "monadelphous;" when nine are joined, and one stands separate, they are "diadelphous." The latter mode of growth is found in the principal part of the European Leguminosæ; those species that have the stamens absolutely free are chiefly Australian and south African. The ovary is in almost all cases solitary and one-celled; the ovules are usually numerous, sometimes very few, or even solitary; when ripe, it becomes a pod or legume, as above mentioned. The principal exception as regards this part, occurs in the well-known *Wista'ria Sinen'sis*, which frequently has two ovaries. The same condition is observable in the genera *Dipla'ca* and *Gleditsch'ia*, and in the *Cæsalpin'ia digy'na*. Theoretically, five carpels are needed to the symmetry of the flower, so that it is not surprising to find an occasional tendency in that direction. A Brazilian *Mimo'sa* is said to possess the full number.

Much has to be observed in respect of the Leaves of the Leguminosæ. Trifoliolate leaves are common, the outlines of the leaflets often quaint or elegant in the highest degree. Simply-pinnate leaves are still more abundant, the leaflets sometimes diminishing in size upwards, as in vetches; sometimes enlarging as they recede from the base, so as to render the leaf V-shaped, as in Cassias; sometimes developed, in their final pairs, only as tendrils. Digitate leaves occur in lupines; doubly-pinnate ones in multitudes of beautiful plants, mostly trees and shrubs, belonging to foreign and chiefly hot countries. No descriptions can give an idea of the latter—they vary almost as much as ferns, and must be studied in conservatories, amid the green lace of the Acacias and the Mimosas. Whatever their particular form,—trifoliolate, digitate, or pinnate,—they are extremely prone to close in the evening, exhibiting the phenomenon figuratively called "vegetable sleep," and reopening their leaflets soon after sunrise. The frequency of this occurrence marks the family as one preëminently of compound leaves, since the lobes or segments of divided leaves, however closely they resemble the leaflets of compound ones, never in the slightest degree change their position. The leaflets of many kinds move not only at the approach of darkness, but when touched. Such is the case with the various kinds of "Sensitive-plant," including the large broad-leaved *Mimo'sa sensiti'va*, the *Mimo'sa pudi'ca* or Humble-plant, the *Smith'ia sensiti'va*, and the *Cæsalpin'ia Mimosoi'des*. The "Moving-plant" or *Desmo'dium gy'rans*, not infrequent in good hot-houses, and well figured by Jacquin, (*Icones Plantarum Rariorum*, iii. 565.) does not

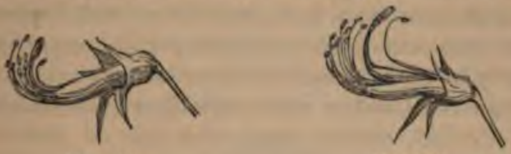
Fig. 108. Fig. 109.
Diadelphous stamens.

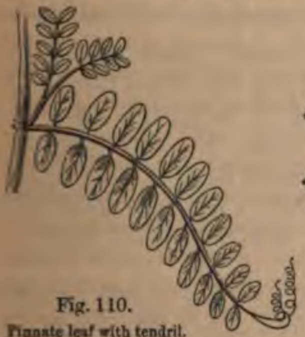
Fig. 110.
Pinnate leaf with tendril.

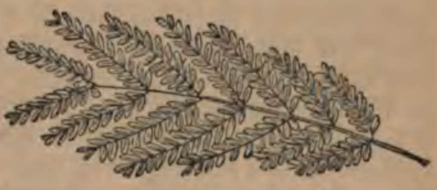
Fig. 111.
Doubly-pinnate leaf of Acacia.

wait to be touched: when the atmosphere is warm, the two lateral leaflets, which are much smaller than the terminal one, keep moving up and down, fast enough for the eye to follow easily, both evenly rising, or both bending downwards, or one moving in each direction, with all the seeming-caprice of the arms of a semaphore. Very many Leguminosæ of the extreme southern lands of the old world have *simple* leaves. These, as in the *Choroze'mas*, are often prickly-edged, and resemble holly. Many others of the same regions, after they are a few inches high, cease to put forth proper leaves, and, in place of them, develope the petioles to a great size. These *quasi*-leaves, or "phyllodia," may generally be distinguished from true leaves by the plane of the surface being vertical, and by a twist at the base which is the cause of it.

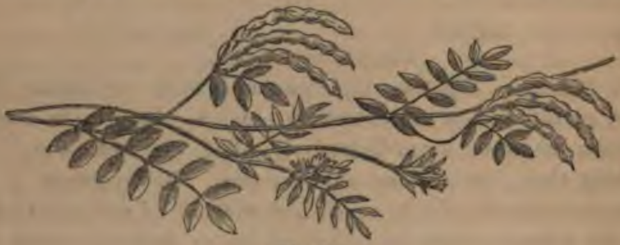

Fig. 112.
Legumes and pinnate leaves of Bird's-foot.

The European *Lath'yrus Nisso'lia*, the "Crimson grass-vetchling" of the English Flora, supplies an instance of phyllodia among herbaceous plants, true leaves being never produced. Finally, there are many cases among the Leguminosæ in which neither leaves nor phyllodia are developed, their absence being compensated either by inordinately-enlarged stipules, as in the *Lath'yrus Aph'aca*, a rare plant of our own cornfields, or by a flattening of the stem, as in the *Bossiæ'a ru'fa* and the *Aca'cia ala'ta*.

Whatever is to be said in admiration of the leaves, applies fourfold to the Seed-pods of the Leguminosæ. Nature seems to take a droll and special delight in showing how many changes can be wrought upon an idea so simple as that of the pea, and which in the pea would be thought complete. In our own country, the little legumes of the *Medica'go* roll up into prickly spheres; those of the *Orni'thopus* are jointed, and growing in sets of 3—4, resemble the claws of a new-fledged bird; in the exotic, and especially in the tropical genera, no forms are wanting that splendid artifice can devise. The legumes of the *Colute'a arbores'cens*, (a common shrub in gardens) are so much inflated, and of substance so thin and transparent, as to have gained for it the name of "Bladder-senna;" those of the *Scorpiu'rus* or caterpillar-plant resemble fat grubs; those of the snail-plant are helicoid, and those of the *Mulle'ra* like a string of beads. Some legumes found in botanical museums are twisted and coiled so as to resemble writhing snakes; others are shaped like a scimitar, or covered with dense brown hair, or defended by great prickles, like those of a chesnut. The ordinary kinds, when ripe, and the atmosphere is dry and hot, are apt to burst open, sometimes with a sharp crack, the valves curling up spirally and discharging the seeds. These include a considerable number of the most beautiful in nature. They are often of resplendent colours, or prettily mottled, as in the common French and kidney-beans; and even in a single genus, as among lupines, we may find a dozen different shades and modes of spotting. Everyone is acquainted with the brilliant scarlet beads, black at one end, of the common rosary-pea, or *A'brus precato'rius;* and there are few fireside museums which do not contain the huge, flat or convex, and polished brown seeds, two inches across, called "Lady-nuts." These are the produce of the *Enta'da Pursæ'atha*, the pods of which are a yard long! The seeds of the Leguminosæ furnish also the best examples of the dicotyledonous embryo. Just before they are ripe, the *funiculus*, or cord by which the ovule is attached to the placenta, is very conspicuous; and there are many in which the large *hilum* extends half-way round. It may be added, that the Leguminosæ are rarely of aquatic predilections; and that among the many elegant forms of inflorescence occurring among them, one, which may be named the "chaplet," is almost peculiar. The chaplet is generally described as a "depressed umbel." It is formed of a number of flowers placed horizontally, or in an obliquely-pendent position, upon the summit of a long peduncle, and spreading in all directions, so as to form, in perfect examples, a complete circle. Fig. 114 shows its appearance in the *Lo'tus*, the *Hippocre'pis*, and certain species of *Coronil'la*. The obliquely-pendent position is almost universal in the Papilionoideæ, and contributes greatly to the pleasing beauty of their inflorescence. Like the leaves of this family, all corollas of the butterfly-form exhibit a considerable degree of sensitiveness to light and warmth. The standard elevates itself when the sun shines, and folds together chevron-wise during darkness and wet, sometimes so completely as to make the plant seem out of bloom. Double flowers are extremely rare in the Leguminosæ; the common furze, the *Spar'tium jun'ceum*, the *Genis'ta tincto'ria*, and the meadow Lotus, are the only examples commonly met with. Malformations of the flower are almost unknown. Odour is rather uncommon, and seldom remarkable, though delicious in the common honey-clover, the sweet-pea, and the *Lo'tus al'bidus.*

Reduced to a few words, the characters of the family express themselves as follows:—Stem herbaceous, shrubby, or arborescent; sometimes twining. Leaves mostly alternate, usually stipuled, compound in every variety; sometimes reduced to a single leaflet, or even to a thorn, and, when the stem is slender, often terminating in tendrils. Flowers, in the great mass of the family, irregular and mostly papilionaceous, with ten stamens that often adhere by their filaments; in the remainder regular and rosaceous, with numerous unconnected stamens; occasionally without petals, and sometimes unisexual. Ovary usually solitary, with a single style and stigma. Fruit almost universally a legume, subject to considerable modifications of shape; in a few cases drupaceous.

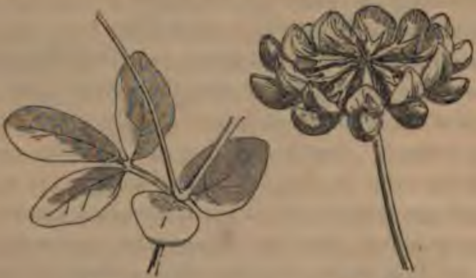

Fig. 113. Fig. 114.

Chaplet and leaf of *Lotus major.*

The estimated number of Leguminosæ is seven thousand. About seventy grow wild or are naturalised in Great Britain, and several others seem about to take up their residence here, as *Coronil'la va'ria,* (Bot. Mag. viii. 258.) a common garden flower, with pinnate leaves, and triple chaplets of lilac blossoms. *Melilo'tus parviflo'ra* and *Melilo'tus Messanen'sis,* have been noticed in corn-fields and upon ballast-heaps, evidently from seeds accidentally imported. Three species formerly accounted wild, are now rejected from the catalogues, namely, *Medica'go murica'ta, Lo'tus decum'bens,* and *Vi'cia læviga'ta.* (E. B. vii. 483.) which last was said to grow upon the beach at Weymouth. The whole seventy have papilionaceous corollas; the two kinds of furze, the Genistas, the broom, and sometimes the rest-harrow, are shrubby; the remainder are herbaceous, and often tender-stemmed, many putting forth tendrils in order to rise in the air.

A.

PLANT MORE OR LESS THORNY.

1. *Flowers pink.* Stems prostrate or in part erect, 12—18 inches long or high, branched, woody, and leafy. Lower leaves trifoliolate; upper ones simple. Standard striated. Foliage somewhat viscid. 7. REST-HARROW.

2. *Flowers yellow.* Pods about half an inch long.
   - *a.* Leaves ovate-lanceolate, very small, glabrous. Stems 12—18 inches high. Lower branches leafless. Upper branches thornless. Thorns very fine and sharp. Pods glabrous. Seeds 10—12. 5. NEEDLE-WHIN.
   - *b.* No broad *flat* leaves after the plant is a mere seedling, 2—3 inches high, the whole of the foliage being subsequently developed in the condition of green spines. Branches innumerable, green and striated. Flowers usually very numerous.
     - Calyx very hairy. Bracts ovate and lax. Plant 2—5 feet high. Thorns straight. 1. COMMON FURZE.
     - Calyx glabrous or finely pubescent. Bracts very minute and appressed. Plant usually low-growing, and often procumbent. Thorns somewhat recurved. 2. DWARF AUTUMNAL FURZE.

B.

PLANT WITH TENDRILS AT THE EXTREMITIES OF THE LEAVES, OR IN THE AXILS.

1. *Flowers decidedly yellow;* conspicuous.
   - *a.* Flowers sessile, axillary, and solitary. Stems 6—12 inches long or high. Leaves pinnate, the leaflets in 6—9 pairs. Legumes hairy.
     - Standard glabrous. Stems diffuse. Stipules with a coloured spot. 58. ROUGH-PODDED YELLOW VETCH.
     - Standard hairy on the outside. Stems ascending. Stipules entirely green. 59. HAIRY-FLOWERED YELLOW VETCH.
   - *b.* Flowers solitary, on axillary peduncles, small and lemon-coloured. Stipules very large, triangular, resembling and standing instead of leaves, no true leaves being developed after the plant is 2 inches high. Tendrils from the axils. 64. LEAFLESS YELLOW PEA.
   - *c.* Flowers in racemes or clusters of 8—10, supported on axillary peduncles 2—4 inches long. Stems 1—3 feet high, much branched, slender, and diffuse. Stipules nearly as large as the leaflets, which are lanceolate, and only two. Pods black and glabrous. 67. YELLOW VETCHLING.

2. *Flowers red, purple, blueish, or parti-coloured. Leaflets only two to each leaf.*
   - Peduncles 1—2-flowered. Stem 1—2 feet high, very little branched. Pods remarkably hairy. Annual. 66. ROUGH-PODDED PEA.
   - Peduncles long, 3—8-flowered. Stems winged, climbing, 5—6 feet high. Leaflets 3 inches long, ribbed. Pods glabrous. Perennial. 69. WILD EVERLASTING-PEA.
   - Peduncles 3—6-flowered. Stem angular, not winged, about 2 feet high. Leaflets oval. Roots with tuberous knobs. Perennial. Seeds smooth. 68. TUBEROUS-ROOTED PEA.

(Leaves with tendrils.)

3. *Flowers purplish blue. More than two leaflets to every leaf.* Most of the leaflets nearly or more than an inch long; sometimes considerably more.

a. *Stipules deeply-toothed,* especially on plants of inland growth. Flowers mostly solitary, purple, with whitish wings; the peduncles shorter than the leaves. Leaflets elliptic-lanceolate, in four pairs on the lower leaves, in two pairs on the upper ones. Pods hairy. 61. Bithynian Vetch.

b. *Stipules entire.* Plant glabrous.

Stems winged, 2—3 feet high. Leaflets lanceolate. Peduncles 3—8-flowered. Corolla large, blueish-purple. Stipules narrow-lanceolate, half-sagittate. 70. Blue Marsh Pea.

Stems prostrate, angular, but not winged; the roots running deep among the stones. Leaflets ovate or elliptical, in 3½—4½ pairs, one of the uppermost being always absent, or nearly so.—Peduncles with 6—8 purplish flowers. Stipules large, broadly-ovate, or cordate arrow-shaped. 71. Seaside Pea.

4. *Flowers red, blueish, purple, or white with dark veins. More than two leaflets to every leaf.* Leaflets all, or most of them, much less than an inch long.

a. Flowers axillary; sessile, or nearly so.

Flowers mostly four together, dull-purple. Plant 12—18 inches high. Pods black. 60. Common Hedge Vetch.

Flowers solitary, or not more than two together.

Stipules each with a more or less evident dark and sunken spot, looking as if stamped with a hot iron. Seeds smooth.

Flowers mostly solitary. Leaflets linear; those of the lower leaves inversely heart-shaped. Corolla wholly crimson. 56. Narrow-leaved Crimson Vetch.

Flowers mostly in pairs. Leaflets oblong. Corolla parti-coloured. 55. Fodder Vetch.

Stipules without spots, and entire. Seeds cube-shaped and tubercled. Flowers solitary, purplish, or white. Leaflets mostly in three pairs. 57. Pea Vetch.

b. Flowers two or more together upon the summit or upper portion of long axillary peduncles.

* Flowers many in a cluster, showy and conspicuous. Peduncles of the clusters often 4—5 inches long. Stems weak and scrambling, or climbing 2, 3, 5—6 feet high.

Flowers violet and blue, in long, slender, crowded, unilateral clusters of about thirty. Leaflets linear, silky, in about ten pairs. Pods light-brown. 54. Purple-tufted Vetch.

Flowers whitish, streaked with lilac, in an open raceme of 8—20. Leaflets oval-elliptical, in about eight pairs. 53. Pencilled Wood Vetch.

(LEAVES WITH TENDRILS. *Flowers blueish.* Leaflets numerous and small. *Peduncles long.*)

** Flowers few, extremely minute, pale blueish, or pink with purple veins. Leaflets linear-oblong. Stems slender, 1—2 feet high, branchy, and often tangled.

Peduncles about six-flowered. Pods two-seeded, usually hairy. Leaflets obtuse. 62. COMMON TARE.

Peduncles 1—4-flowered. Pods 3—8 but usually 4-seeded, glabrous. Leaflets pointed. 63. SMOOTH-PODDED TARE.

C.

PLANT NEITHER THORNY NOR TENDRILLED. LEAVES (or at least the upper ones) SIMPLE AND LANCEOLATE OR OBLONG.

1. *Flowers pink or purple.*

Leaves obovate or oblong, not much more than an inch in length. Flowers sessile or on very short peduncles. Stems more or less prostrate, branched, and woody. Lower leaves often trifoliolate. Perennial. 7. REST-HARROW.

Foliage grass-like, consisting only of leaf-like petioles, which end in fine points. Stems mostly erect, 12—18 inches high. Peduncles long, 1—2-flowered. Plant glabrous. 65. CRIMSON GRASS VETCHLING.

2. *Flowers yellow.*

a. Leaves *all* simple and lanceolate.

Stems erect, 1—2 feet high, furrowed and leafy. Leaves nearly glabrous, deep and shining green. Flowers in terminal, spicate, and rather dense racemes. Pods glabrous. 3. DYERS' GREENWEED.

Stems procumbent. Leaves silky beneath. Flowers axillary, on short pedicels, crowded about the summits of the branches. Pods downy or hairy, with 3—4 seeds. 4. HAIRY GENISTA.

b. Upper leaves simple and lanceolate; lower ones trifoliolate. Stems shrubby, mostly upright, 2—6 feet high. Branches long, straight, green, furrowed, smooth, and pliant. Flowers very large, axillary, longer than the leaves, brilliant-yellow, dishevelled soon after expansion, and with the style curved into a loop or ring. Pods numerous, large, flat, nearly black, and fringed with white hairs along the edges. 6. COMMON BROOM.

D.

PLANT NEITHER THORNY NOR TENDRILLED. LEAVES ALL COMPOUND—*i. e.*, either PINNATE OR TRIFOLIOLATE. (Upper leaves occasionally palmate.)

1. Leaves sessile, composed of five leaflets, the lowermost pair close upon the stem, resembling stipules, and quite entire. Stems slender. Flowers yellow, usually in chaplets, (sometimes only 2—3 together, or even solitary,) the general peduncles 2—6 inches long. Pods cylindrical, many-seeded.

Perennial. Leaflets obovate.

Stems mostly decumbent, 3—12 inches long. Flowers 2—5 together. Two of the calyx-teeth converging. 41. COMMON MEADOW LOTUS.

Stems mostly erect, 1—2—3 feet high. Chaplets 8—12-flowered, nearly perfect. Calyx-teeth all spreading in a star-like manner while young (Fig. 113.) 42. GREAT CORONET LOTUS.

Annual. Leaflets ovate-lanceolate. 43. ANNUAL LOTUS.

(Plant neither thorny nor tendrilled. Leaves all compound.)

2. Leaves petiolate, *pinnate*, consisting of 2—4—12 pairs of mostly opposite leaflets, and usually a single one at the extremity.

   a. Plant annual. Stems very slender, mostly prostrate, 2, 6, 8, 12—18 inches long. Leaflets numerous, minute, obovate or oblong.—Flowers very minute, 2—5 together on the summit of slender peduncles.

   Apex of the general peduncle bearing a small leaf just below the flowers, which are whitish or pale yellow, with crimson streaks upon the standard. Pods jointed, curved, in clusters of 3—5, resembling the claw of a little bird (Fig. 112.) 49. Common Bird's-foot.

   No leaf at the apex of the general peduncle. Flowers yellow, the standard reddish at the back. 50. Arthrolobium.

   b. Plant perennial. Petioles (reckoning to the end of the leaf) *full six inches long*. Stem prostrate, 2—3 feet long. Leaflets oval. Peduncles shorter than the leaves, and bearing ovate spikes or short racemes of dingy flowers. Pods an inch or more in length, curved and glabrous. 46. Sweet Milk-vetch.

   c. Plant perennial. Flowers bright yellow.

   Flowers in dense, terminal, clover-like heads, which are nearly sessile, and grow two together, one of them a little below the other, and opening earlier. Calyx inflated, white below, purplish above, and very downy. Stems procumbent or ascending, 6—12 inches long or high, clothed with silky hairs. Leaflets increasing in size upwards, and the terminal one disproportionately large. Uppermost leaves or bracteas palmate. Pods one-seeded, concealed in the calyx. 9. Common Kidney-vetch.

   Flowers in chaplets of 6—9, like those of the Great Coronet Lotus, and elevated high above the foliage. Stems 4—6 inches high, woody, and much branched at the base. Leaflets in 3—6 pairs. Pod composed of numerous crescent-shaped joints, which resemble a series of horse-shoes placed in a row and united by their extremities. 51. Tufted Horse-shoe-vetch.

   d. Plant perennial. Flowers red, purple, cream-colour, or white, or with a mixture of these colours.

   * Plant almost stemless. Leaves and peduncles alike from the crown of the root-stock. Leaflets in 8—10 pairs. Flowers capitate.

   Flowers bright-purple. Whole plant densely clothed with soft, silky hairs. Flower-stalks longer than the leaves. 44. Silky Oxytropis.

   Flowers cream or buff-coloured, the keel and wings tinged with purple. Plant only slightly silky, often nearly glabrous, the flower-stalks and the leaves about equal in length. 45. Pale Oxytropis.

(PLANT NEITHER THORNY NOR TENDRILLED. Leaves pinnate. *Perennial. Flowers red, purple, cream-colour or white*, or with a mixture of these colours.)

** Stem well-developed. *Leaves with a terminal leaflet.*

Flowers in terminal heads, which grow in pairs, one a little lower than the other. Calyx densely hairy. 9. COMMON KIDNEY-VETCH (variety.)

Flowers crimson, with pink and white streaks, in spicate and pyramidal racemes. Stems 1—3 feet high, partially recumbent, and not much branched. Leaflets numerous and elliptical. Pods one-seeded.
52. SAINT-FOIN.

Stem prostrate, weak, branching, 2—6 inches long. Flowers blueish-purple or white, in short spikes or round heads, which are large in proportion to the plant. *Pods erect.*
47. PURPLE MOUNTAIN ASTRAGALUS.

Like the preceding, but the flowers few, and the pods *pendulous* and clothed with black hairs. 48. ALPINE ASTRAGALUS.

⁂ Stem well-developed. *Leaves without a solitary and terminal leaflet*, the rudiment of a tendril taking the place of one.

Stems *unbranched*, erect, *glabrous*, 12 inches high. Leaflets large, elliptical, in 2—4—6 pairs. Flowers rather few, in long-stalked, axillary racemes, purple or crimson, with the standard veined. Pods red while young; black when ripe. Roots swelling here and there into oblong knobs or tubers. 72. COMMON BITTER-VETCH.

Stem *branched*, erect, *glabrous*, 18—24 inches high. Leaflets in 3—6 pairs. Flowers purplish-crimson, 4—5 together, on axillary stalks rather longer than the leaves. Roots without tuberous knobs.
73. BLACK BITTER-VETCH.

Stem *branched*, 1—2 feet long, decumbent and *hairy*. Leaflets numerous. Flowers numerous, white, streaked and tipped with purple, in axillary and *unilateral* racemes.
74. WHITE SYLVAN BITTER-VETCH.

3. Leaves *trifoliolate*, and usually with petioles.

a. Flowers yellow, the colour usually bright and decided.

Shrub, 2—6 feet high. Branches long, smooth, green, and pliant. Flowers numerous, large and handsome, soon becoming dishevelled. Style curved into a loop. Legumes numerous, large, nearly black, and fringed along the edges with white hairs. 6. COMMON BROOM.

Herbaceous plants.

* Flowers in upright racemes. Pods longer than the calyx, usually few-seeded.

Racemes unilateral, axillary, 2—3 inches long. Leaflets narrow, egg-shaped, and serrate.

Pods irregularly net-veined and wrinkled, usually hairy. Stems usually 2—3 feet high.
16. COMMON MELILOT.

Pods transversely wrinkled, glabrous. Stems usually under two feet high.
17. FIELD MELILOT.

(PLANT NEITHER THORNEY NOR TENDRILLED. Leaves trifoliolate. *Flowers yellow.* Herbaceous plants. Flowers in upright racemes.)

Racemes not unilateral, close, in length about an inch, sometimes 1½—2 inches. Leaflets obovate-oblong or narrow-linear. Plant perennial, nearly glabrous.

Stems mostly decumbent, 1—2 feet long. Pods sickle-shaped, or not forming more than one complete ring.
10. SICKLE-FRUITED MEDICK.

Stems mostly erect. Pods coiled into 2—3 distinct rings.
11. LUCERN (yellow var.)

** Flowers in ovoid or globular heads or little umbels; individually minute.—Stems slender and often wire-like. Annuals.

† Pod scarcely protruding beyond the calyx, and straight, or at least neither prickly nor twisted. Petals persistent.

Heads of flowers large, ovoid, dense, and showy, the 30—40 corollas turning brown, and the pedicels bending downwards, when overblown. Upper petal conspicuously furrowed when fading. 38. YELLOW HOP TREFOIL.

Heads of flowers scanty and small. Upper petal scarcely or not at all furrowed.

Calyx softly hairy, rendering the head of flowers softly downy. 22. *Trifo'lium Moline'rii.*

Calyx glabrous. Leaflets narrow-oblong.

Middle leaflet stalked; heads 10—20-flowered.
39. LITTLE YELLOW TREFOIL

Middle leaflet sessile; heads 2–3—5–6-flowered.
40. LEAST YELLOW TREFOIL.

†† Pod projecting far beyond the calyx, usually edged with prickles, and either kidney or sickle-shaped, or spirally twisted.

A. Pod spiral, prickly, and several-seeded; plant procumbent.

Spire of 3—4 convolutions, and furrowed at the edge.

Plant glabrous. Leaflets obovate, usually with a black spot. Stipules toothed.
13. SPOTTED MEDICK.

Leaves downy; the leaflets obovate, without a black spot. Stipules nearly entire. Peduncles 1—5 flowered. 14 LITTLE BUR MEDICK.

Spire of 2—3 convolutions, and not furrowed at the edge. Leaflets obcordate. Stipules laciniated.—Peduncles 2—5-flowered.
15. TOOTHED MEDICK.

B. Pod not forming a complete spire; kidney-shaped, rugged, black, and one-seeded; the clusters of legumes oval, and ½—¾ of an inch long. Flowers in ovoid heads, not turning brown when withered. Plant more or less procumbent, sometimes nearly erect. Leaflets mostly broad and roundish. Stipules nearly entire. 12. COMMON FIELD MEDICK.

(PLANT NEITHER THORNY NOR TENDRILLED. Leaves trifoliolate.)

b. Flowers red, pink, purple, violet, cream-coloured, or white; usually in dense globular, ovoid, or cylindrical heads; occasionally in little umbels or racemes. Herbaceous plants.

Plant annual. Legumes *twice as long as the calyx*, and containing 6—8 seeds. Flowers small, about three together. Stems decumbent, 3—5 inches long. 19. TRIGONELLA.

Plant annual. Legumes containing 10—16 seeds. Branches spreading, hairy, and usually viscid. Flowers pale pink, in short terminal and leafy racemes, the pedicels axillary and one-flowered. 8. ANNUAL ONONIS.

Plant annual. Legumes concealed in the calyx, or scarcely projecting beyond it, and 1—4-seeded. Flowers in little heads.

* Heads of flowers *pedunculate*, either in the axils of the leaves, or at the extremities of the branches.

† Stem creeping, rooting at the joints, or closely prostrate, the branches hairy, 3—6—8 inches long. Corollas long and slender, almost white. Peduncles elongated after the flowers wither, the heads at the same time bent to the ground. Numerous abortive calyces then lengthen out in the form of white fibres, and enclose the ripening legumes in minute cages, eventually burying them in the soil. 23. SUBTERRANEAN TREFOIL.

†† Stems ascending or erect.

Heads of flowers abounding with long soft hairs; usually cylindrical, or nearly so.

Corollas minute, nearly concealed, pale pink. Stem much branched, 6—12 inches high. Heads numerous. 29. HARE'S-FOOT TREFOIL.

Corollas large and conspicuous, rich crimson or pink, the heads sometimes two inches long. Whole plant hairy; when cultivated, 12—24 inches high. 22. CARNATION CLOVER.

Heads of flowers without long hairs. Corollas small and inconspicuous.

Calyx-teeth short, lanceolate, slightly-ciliate, rigid, and spreading. Stems 12—18 inches high. 27. TEASEL-HEADED TREFOIL.

Calyx-teeth short, subulate, and glabrous. Leaflets long, narrow, and toothed. Plant 2—6 inches high. 35. MELILOTUS-LEAVED TREFOIL.

Calyx-teeth longer than the cream-coloured corollas; at first straight, afterwards greatly enlarged, and spreading in a starlike manner. 28. STAR TREFOIL.

Calyx inflated after flowering, like that of the Strawberry-trefoil. Stems prostrate. Standard turned upwards. 37. RESUPINATE TREFOIL.

(PLANT NEITHER THORNY NOR TENDRILLED. Leaves trifoliolate. *Flowers red, pink, or white. Plant annual.* Legumes concealed in the calyx. Flowers in little heads.)

** Heads of flowers *closely sessile* in the axils of the leaves.

Heads globular. *Calyx glabrous*, with short, recurved teeth. Seeds two. Stems prostrate. Corollas minute.

Heads crowded at the base of the branches, which are 3—4 inches long. Corolla shorter than the calyx. 32. SUFFOCATED TREFOIL.

Heads distinctly scattered along the branches. Corolla rose-coloured, longer than the calyx. 31. SMOOTH ROUND-HEADED TREFOIL.

Heads ovoid, globular or oblong when fully out. *Calyx more or less hairy*, with rigid, erect, or spreading teeth.

Calyx-teeth, after flowering, recurved and spreading.

Stems ascending, 12—18 inches high. Calyx-teeth becoming remarkably leafy and dilated after the flower fades, and as the seed ripens. 27. TEASEL-HEADED TREFOIL.

Stems spreading, seldom more than six inches long. Whole plant very rigid and harsh, especially after flowering, when the calyx-teeth are strongly recurved. 30. ROUGH-HEADED TREFOIL.

Calyx-teeth remaining erect, or nearly so, after flowering.

Branches usually procumbent, 4—8—10 inches long. Leaflets obovate. Heads downy, mostly solitary. 33. SOFT KNOTTED TREFOIL.

Stems 2—6 inches high, erect. Heads mostly in couples. Flowers very pale. Leaflets nearly linear. 34. BOCCONE'S TREFOIL.

Plant perennial. Stems *prostrate and creeping*, 9—12—18 inches long.—Leaflets serrulate. Flowers in globular heads, which are elevated upon erect peduncles, usually to the height of 3—6 inches above the ground.

Flowers pure white, conspicuous; sometimes tinged with pink; corollas persistent, turning brown and bent downwards when withered. Calyx glabrous. Legumes four-seeded. 20. COMMON WHITE CLOVER.

Flowers pinkish, insignificant. Calyx remarkably inflated after flowering; then very thin, membranous, reticulated, with the mouth contracted; the head resembling a globular mass of little bladders, and often pinkish. 36. STRAWBERRY TREFOIL.

Plant perennial. Stems *erect or decumbent*, 3 inches—1—2 feet high.

a. Flowers in loose racemes.

Flowers violet-coloured. Pods coiled into 2—3 distinct rings. 11. LUCERN.

Flowers cream-coloured or whitish.

Stem erect. Standard longer than the wings and keel. Legumes two-seeded, ovate, and wrinkled. 18. WHITE MELILOT.

Plant decumbent and nearly glabrous. Legumes sickle-shaped, very slightly twisted. 10. SICKLE-FRUITED MEDICK.

(PLANT NEITHER THORNY NOR TENDRILLED. Leaves trifoliolate. Flowers red, pink, cream-coloured, or whitish. *Plant perennial.* Stems *erect or decumbent.*)

b. Flowers in dense heads.

Heads densely ovoid, usually sessile, the flowers fragrant, red or pink, but variable in tint, and occasionally pure white. Stems straight or nearly so, angular and hollow. Leaflets oval, often marked with a white arch. Stipules ovate, abrupt, hairy only at the apex, and bristle-pointed. 25. COMMON HONEY CLOVER.

Heads lax, sub-globular, as if flattened upon the summit, and with short peduncles. Stems usually very zigzag, cylindrical, or nearly so, and usually hard and wiry. Leaflets without white arches. Stipules lanceolate and acuminate. Flowers always deep crimson, and scentless. 26. ZIGZAG CLOVER.

Heads at first hemispherical, afterwards ovoid. Stems downy, 12 inches high. Stipules subulate and villous. Calyx hairy, at least upon the teeth. Flowers cream-coloured. 24. CREAM-COLOURED CLOVER.

Heads globular, the flowers white, tinged with pink. Calyx-teeth equal in length, half as long as the corolla. Stem hollow, ascending, 12—18 inches high. 21. HYBRID CLOVER.

HABITATS AND DISTRIBUTION.

1. COMMON FURZE—*U'lex Europæ'us.*

Heathy and waste ground, and upon dry and exposed commons, which are often refulgent with its innumerable golden blossoms; also by waysides, and occasionally in hedges; common everywhere, except in the Highlands of Scotland, and flowering more or less all through the year, but most abundantly and brilliantly in the early part of summer.

When furze is out of blossom, kissing is out of season.

E. B. ix. 742; Baxter, ii. 93.

Opening its cheerful blossoms while the snow still lies in white bones upon the hedgebanks, and with the hoar-frost often glazing its yellow clusters, the furze is a gladsome sight when there is scarcely another wild-flower to be seen. It is frequently golden all over on St. Valentine's day, and, in mild seasons, renews its flowers by Christmas. No plant is more broadly characteristic of English scenery and of the English climate. Warmth is incongenial to its rude and hardy nature; yet though to appearance so robust, in Russia, Sweden, and Norway, it needs the shelter of the green-house. Linnæus, when he came to this country, fell on his knees with admiration of the magnificent spectacle it presented to him, having never before seen it in such splendour and profusion. Ordinarily it is a mere bush, but in sheltered situations, it will attain the height of 12—18 feet. The flowers have a strong and oppressive scent, resembling that of rue or coco-nut, but said to be sometimes not perceptible. This is probably when the pride of the blooming is over, since the exhalation of odour by flowers is for the most part concurrent with the period of the fertilisation of the pistil, and ceases when that process is complete. When ripe, the seed-pods are nearly black; upon hot days they burst with a sharp crackling noise, and shoot out the seeds. Seedling plants, which spring up plentifully where the ground is a little moist, may be found about midsummer, with trifoliolate leaves, that plainly show the nature of the thorns which afterwards usurp the place of normal foliage.

In gardens there is commonly cultivated a very handsome variety with double flowers. Another, called Irish furze or *U'lex stric'tus*, is remarkable for its close, erect, and compact habit of growth, the branches being nearly vertical. It rises to the height of two feet or more, and is so soft and succulent as to be useful for fodder. The flowers, which seldom appear, and never in any plenty, are confined to the summit. The original plant was found in the county of Down.

2. DWARF AUTUMNAL FURZE—*U'lex na'nus.*

Dry commons and moors, and in rough and hilly pastures; abundant. Fl. only in the autumn.

E. B. xi. 743.

The normal form of this plant is very dwarf and procumbent, and occurs principally in the eastern parts of England. When taller, and disposed to become erect, and with a larger calyx, (the condition in which it is commonly found in the western counties and in Wales) it becomes the *U'lex Gal'lica* or *Gal'lii*. Upon Alderley Edge, near Manchester, it attains the height of five feet.

3. DYERS' GREENWEED—*Genis'ta tincto'ria.*

Rough pastures, especially upon dry and exposed hills, by waysides, in thickets, and along the dry borders of fields; common. Rare in Scotland and Ireland. Fl. July, August.

E. B. i. 44; Baxter, ii. 84.

A variety with the stems procumbent occurs in Cornwall.

4. HAIRY GENISTA—*Genis'ta pilo'sa.*

Dry, sandy, and gravelly places, especially heaths and the slopes of hills, and on the margins of their rough roads; a rare plant of the south and west. Fl. May, and again in September.

E. B. iii. 208.

5. NEEDLE-WHIN—*Genis'ta Ang'lica.*

Moist and boggy heaths, and on moist slopes of hills among bushes; tolerably common in England and Scotland, but not found in Ireland. Fl. May, June.

E. B. ii. 132.

6. COMMON BROOM—*Spar'tium Scopa'rium.*

Dry thickets, hedges, and fields, especially upon gravel; upon railway embankments, by waysides, and upon hills; frequent almost everywhere in Great Britain and Ireland, and often provided as a cover for game. Fl. May, June,

Curtis, ii. 344; E. B. xix. 1339; Baxter, i. 77.

The largest and most showy of our native yellow-flowered Leguminosæ, the plant being often a complete mass of golden butterflies. In gardens and shrubberies, of which it is a very common ornament, the blossoms vary to straw-colour.

7. REST-HARROW—*Ono'nis arven'sis.*

Barren pastures; dry, ill-cultivated fields; and upon slopes of sunward hills where the soil has little moisture in it, and the turf is short and pleasant to sit upon. Abundant also on waste ground near the sea, and then often half-covered with sand. Fl. June—September.

The extreme forms of this variable plant have, as in many similar cases, been distinguished under several names. When the stems are erect, and spinous at all seasons, it is the *Ono'nis spino'sa* or Thorny Rest-harrow (E. B. x. 682; Baxter, iv. 289, as *Ono'nis antiquo'rum.)* When procumbent, and spinous only at the close of summer, or never so, it is the *Ono'nis re'pens* or Trailing Rest-harrow. (E. B. Supp. i. 2659.)

When fully expanded, which is only in bright sunshine, the flowers present a most beautiful appearance, being large, and of a fine lively pink, with the standard elegantly striated.

8. ANNUAL ONONIS—*Ono'nis reclina'ta.*

Dry waste places near the sea; very rare. Channel Islands. South-west coast of Scotland. Fl. May, June. Annual.

E. B. Supp. iii. 2838.

9. COMMON KIDNEY-VETCH—*Anthyl'lis Vulnera'ria.*

Dry fields and waste places in the limestone and chalk districts, and more especially in waste sandy ground by the sea; common. Sometimes upon the stony borders of mountain-rivulets. Fl. June—September.

E. B. ii. 104; Baxter, v. 397.

An exceedingly pretty plant, and presenting many curious details, as in the coupled heads of flowers, the inflated and hairy calyx, and the palmate bracteas, alluded to in the duplicate name of "Lady's fingers." The lively primrose-yellow of the flowers is occasionally exchanged, in stunted individuals growing near the sea, for red, cream-colour, or white.

10. SICKLE-FRUITED MEDICK—*Medica'go falca'ta.*

Dry gravelly banks, and upon old, earthy, and weedy walls; chiefly in the south and east, but rare. Abundant in fields near Ranworth, Norfolk. Fl. June, July.

E. B. xv. 1016.

11. LUCERN—*Medica'go sati'va.*

Occasionally in waste places, upon the borders of ploughed fields, on railway banks, and among clover, but nowhere truly wild, such seeds as now lie in the earth, and the plants that spring from them, being memorials of former cultivation. Fl. June, July.

E. B. xxv. 1749; Baxter, v. 329.

Probably only a variety of the preceding.

12. COMMON FIELD MEDICK—*Medica'go Lupuli'na.*

Everywhere among leafy farm-crops, and especially among "artificial grasses." Abundant also near the borders of fields, and upon old walls where there is loose earth. Fl. May—October. Annual.

Curtis, i. 130; E. B. xiv. 971.

A very valuable plant in agriculture, much resembling the little yellow trefoil, but distinguished by its oval heads of small, black and rugged legumes, the half-spiral rudiments of which are visible while the plant is in flower.

13. SPOTTED MEDICK—*Medica'go macula'ta.*

Dry fields, hill-sides, waste places, and upon heaps of manure, chiefly in the south of England, and there mostly upon limestone. Fl. May—July. Annual.

Curtis, i. 192 (as *M. Arab'ica);* E. B. xxiii. 1616 (as *M. polymor'pha.)*

14. LITTLE BUR MEDICK—*Medica'go min'ima.*

Dry sandy fields in the south and south-east. Abundant on some parts of the coast of Kent. Fl. June, July. Annual.

E. B. Supp. i. 2635.

15. TOOTHED MEDICK—*Medica'go denticula'ta.*

Gravelly places on flats near the coast in the south and south-east. Very abundant near Pegwell Bay, Kent, growing with *Phle'um arena'rium* and similar plants. Fl. May, June. Annual.

E. B. Supp. i. 2634.

16. COMMON MELILOT—*Melilo'tus officina'lis.*

Thickets, dry hedges, dry borders of fields, and on railway embankments; sometimes in cornfields and among arable crops—then, probably, as a descendant of cultivation, being occasionally sown for fodder; rather uncommon. Fl. June, July. Annual or biennial.

E. B. xix. 1340 (as *Trifo'lium officina'le);* Baxter, v. 363.

The racemes resemble those of the purple-tufted vetch, and make a pretty contrast when intermingled with them. When dry, this plant gives out the scent of new-made hay.

17. FIELD MELILOT—*Melilo'tus arven'sis.*

Cornfields and waste places in the eastern parts of England; rare. Fl. July, August. Annual.

E. B. Supp. i. 2690.

Probably only a variety of the *officina'lis.*

18. WHITE MELILOT—*Melilo'tus leucan'tha.*

Dry fields and waste places; rare, and probably nowhere truly indigenous, the plant being one prone to emigrate. Abundant upon the sandhills near Yarmouth. Fl. August. Annual.

E. B. Supp. i. 2689.

19. Trigonella—*Trigonel'la Ornithopodioi'des.*

Dry gravelly fields, heaths and waste places, both inland and by the sea; rare. Fl. June, July. Annual.

Curtis, i. 126; E. B. xv. 1047.

20. Common White Clover—*Trifo'lium re'pens.*

Everywhere in meadows and pastures, and by waysides where rather damp, flowering throughout the summer.

Curtis, i. 191; E. B. xxv. 1769.

The blossoming of the white clover commences with the lower flowers, which, as fast as overblown, turn brown, and ben'd downwards, presenting a singular contrast to the white and erect corollas on the upper and younger portion of the head. The leaves are sensitive to the light, and when the plant is in vigour, generally close at the approach of evening. The leaflets are often marked with white arches, and a variety not uncommon in gardens has the whole surface of a deep maroon colour. In the latter the leaves are often quinate, and even septate. The sepals are frequently so much enlarged as to give the head a green and tufted look, like that of a viviparous grass; and occasionally the corollas assume a pinky tint.

21. Hybrid Clover—*Trifo'lium hyb'ridum.*

Borders of ploughed fields, and other cultivated farm-land; rare, and in no case indigenous. Fl. June, July.

Bot. Mag. lxv. 3702.

A remarkable instance of divided resemblance—the *Trifo'lium re'pens* and the *T. praten'se* each having a measure of its likeness in the *hyb'ridum.*

22. Carnation Clover—*Trifo'lium incarna'tum.*

Dry fields, especially upon their borders; rare. Fl. July. Annual.

E. B. Supp. iii. 2950; Bot. Mag. x. 328.

Introduced, like the preceding, as a farm-plant, and afterwards self-sown. A variety called *Trifo'lium Moline'rii*, less in stature, more downy, and with large soft heads of cream-coloured or pale-yellow flowers, is found wild upon cliffs at the Lizard. The normal form is not uncommon in gardens, where it is grown as an ornamental annual.

23. Subterranean Trefoil—*Trifo'lium subterra'neum.*

Dry hills, open heaths and downs, among short grass, where the soil is chalky or upon a basis of limestone; not rare in the south of England, where alone it is met with. Fl. May, June. Annual.

Curtis, i. 127; E. B. xv. 1048.

24. Cream-coloured Clover—*Trifo'lium ochroleu'cum.*

Dry cultivated fields, in pastures, and by waysides, especially upon limestone. Chiefly in the eastern counties. Fl. July, August.

Curtis, ii. 413; E. B. xvii. 1224.

The corollas turn brown when overblown, like those of the *T. re'pens.*

25. COMMON HONEY CLOVER—*Trifo'lium praten'se.*

Meadows and pastures, everywhere, both cultivated and as the result of former cultivations. Fl. summer and autumn.

E. B. xxv. 1770; Baxter, iv. 283.

The leaflets often have white arches on them, like those of the *T. re'pens.* When, as occasionally happens, the flowers lose their colour, honey-clover is distinguished from the *re'pens* by its upright growth and leafy flower-stems; and from the *ochroleu'cum* by its angular branches, those of the latter being cylindrical.

26. ZIGZAG CLOVER—*Trifo'lium flexuo'sum.*

Meadows, pastures, dry banks, and uncultivated edges of fields; often entangled among low and scrubby bushes; common, especially in the north of England and the south of Scotland. Fl. summer and autumn.

E. B. iii. 190 (as *Trifo'lium me'dium.*)

The heads of bloom are much handsomer than those of the honey-clover, from which plant the zigzag is easily distinguished by their being globular and stalked instead of egg-shaped and sessile. The bent and wavy stems, usually spotless leaves, and scentless flowers, supply other ready characters. The zigzag clover is remarkably fond of residing in scenes of entanglement, among thorns and prickly branches, which render it difficult to get at the flowers without a scratch.

27. TEASEL-HEADED TREFOIL—*Trifo'lium marit'imum.*

Muddy salt-marshes; on the south and east coasts of England, not uncommon. Abundant near Yarmouth. Occurs also in the south of Ireland. Fl. June, July. Annual.

Curtis, iii. 519; E. B. iv. 220.

28. STAR TREFOIL—*Trifo'lium stella'tum.*

South coast of England; very rare. Near Shoreham, Sussex. Fl. July, August. Annual.

Curtis, iii. 518; E. B. xxii. 1545.

29. HARE'S-FOOT TREFOIL—*Trifo'lium arven'se.*

Dry, sandy, and barren fields, and by waysides of similar character, especially near the sea; common, but diminishing in frequency towards the north. Fl. July, August. Annual.

Curtis, ii. 414; E. B. xiv. 944.

The heads of flowers resemble the young catkins of the osier.

30. ROUGH-HEADED TREFOIL—*Trifo'lium sca'brum.*

Dry, sandy, and chalky fields, and waste ground near the sea; chiefly in the south and south-east, but extending to Ireland and Scotland. Very abundant near Pegwell Bay, Kent. Fl. May, June. Annual.

Curtis, ii. 412; E. B. xiii. 903.

31. SMOOTH ROUND-HEADED TREFOIL—*Trifo'lium glomera'tum.*

Gravelly fields and pastures, where somewhat moist; principally in the east and south of England. Fl. June. Annual.

Curtis, ii. 271; E. B, xv. 1063.

32. SUFFOCATED TREFOIL—*Trifo'lium suffoca'tum.*

Dry and exposed places upon the sea-coast; chiefly upon the southern and eastern sides of the island; the whole plant, except a few leaves, generally concealed in the sand. Near Walmer, Kent. Fl. June, July. Annual.

E. B. xv. 1049.

33. SOFT KNOTTED TREFOIL—*Trifo'lium stria'tum.*

Dry barren fields, and hill-sides, among short grass. Often found in company with the *Trifo'lium sca'brum.* Fl. June. Annual.

E. B. xxvi. 1843.

34. BOCCONE'S TREFOIL—*Trifo'lium Bocco'ni.*

Upon the cliffs at the extreme south-west of Cornwall. Fl. summer. Annual.

E. B. Supp. iv. 2868.

35. MELILOTUS-LEAVED TREFOIL—*Trifo'lium stric'tum.*

Dry waste places in the Channel Islands, and on the coast of Cornwall, near the Land's-end. Fl. May, June. Annual.

E. B. Supp. iv. 2949.

36. STRAWBERRY TREFOIL—*Trifo'lium fragif'erum.*

Meadows and pastures; common, but less frequent inland than among the grass on the margins of tidal rivers, and in low ground, and upon sandy flats, near the sea. Fl. July, August.

Curtis, i. 128; E. B. xv. 1050 (not good.)

The strawberry-like heads, formed of the membranous and inflated calyces, are very pretty and curious. Near the sea, the herbage is often half-covered by sand.

37. RESUPINATE TREFOIL—*Trifo'lium resupina'tum.*

Dry pastures and waste places near the sea; occasionally in the south of England, but probably introduced. Fl. May, June, Annual.

E. B. Supp. ii. 2789 (not good.)

38. YELLOW HOP TREFOIL—*Trifo'lium procum'bens.*

Dry pastures, dry waste ground, along the edges of broad grassy lanes, hedgebanks, and on the borders of cultivated fields; very common, except in the north of Scotland. Fl. June—September. Annual.

Curtis, i. 190 (as *T. agra'rium*); E. B. xiv. 945.

A beautiful and interesting plant; well distinguished by its oval, bright-yellow, and hop-like heads, the size of a marrowfat pea, and by the furrows on the upper petal, when a little overblown. When luxuriant, in ploughed land, and drawn up by taller neighbours, it grows to the height of 18 inches; when upon the sea-coast, or among stones, by roadsides, and below rocks, it becomes perfectly procumbent, retaining, however, its large heads of flowers.

39. Little Yellow Trefoil—*Trifo'lium mi'nus.*

Everywhere in meadows and pastures. Fl. all summer. Annual.

Curtis, ii. 345 (as *T. procum'bens*); E. B. xviii. 1256.

40. Least Yellow Trefoil—*Trifo'lium filifor'me.*

Dry waste places, chiefly near the sea, and apparently confined to the south-eastern counties. Fl. June, July. Annual.

E. B. xviii. 1257.

Small and starved specimens of the *Trifo'lium mi'nus* are often mistaken for this.

41. Common Meadow Lotus—*Lo'tus cornicula'tus.*

Meadows and pastures; common everywhere; delighting also in grassless edges of rough banks, where nothing shall intercept the sun. Nowhere does this refulgent little plant seem to enjoy itself more thoroughly than on the sunward slopes of railway-cuttings, where it often forms patches a yard across, looking like waves of molten gold. Fl. May—September.

Curtis, i. 129; E. B. xxx. 2090; Baxter, iv. 249.

The flowers vary sometimes to a tawny orange-colour, and, whatever their tint in maturity, are usually vermilion on the outside before expansion, after which period the redness disappears—a noteworthy circumstance, since flowers generally acquire colour rather than lose it, as they advance towards perfection. A slender, narrow-leaved variety has been distinguished under the name of *Lo'tus ten'uis* (E. B. Supp. i. 2615.) Another, of some rarity, is remarkable for its hairiness.

42. Great Coronet Lotus—*Lo'tus ma'jor.*

Moist and shady borders of ponds and ditches, and in swampy ground such as meadow-sweet prefers, generally supported by taller and stronger plants; common everywhere. Fl. July—September.

E. B. xxx. 2091.

So nearly allied to the common meadow lotus, that many botanists deem the two plants identical, and the characters, it must be confessed, are not such as keep *boná fide* species asunder. The best and most constant appear to consist in the shortness of the petiole of the middle leaflet, and in the broadly cordate and obtuse *quasi*-stipules. The handsome chaplet and the large size of the plant are generally sufficient indications in the distance. It occurs both glabrous and hairy.

43. Annual Lotus—*Lo'tus angustis'simus.*

Meadows near the sea, on the southern and western coasts of England and Ireland; rare. Fl. May, June. Annual.

E. B. xiii. 925 (as *Lo'tus diffu'sus.*)

The *Lo'tus his'pidus* of E. B. Supp. iii. 2823, is a variety of this, stouter and more hairy, with larger and thicker legumes, and often with three flowers to the peduncle.

44. SILKY OXYTROPIS—*Oxyt'ropis Uralen'sis.*

Dry pastures upon mountain-sides in the Highlands of Scotland, chiefly near the sea; rather rare. Fl. July, August.

E. B. vii. 466 (as *Astrag'alus Uralen'sis.)* Not good; failing to represent the remarkable silkiness.

45. PALE OXYTROPIS—*Oxyt'ropis campes'tris.*

A cliff upon the Clova mountains, composed of micaceous schist, is the only British locality in which this plant occurs. Fl. July, August.

E. B. xxxvi. 2522; Baxter, vi. 495.

46. SWEET MILK-VETCH—*Astrag'alus glycyphyl'lus.*

Among trees and bushes, chiefly upon hill-sides, where the soil is gravelly and chalky, and not infrequently on the borders of dry fields; rather rare, and found principally in the eastern counties, and the south of Scotland. Not hitherto observed in Ireland. Fl. June, July.

E. B. iii. 203.

The leaves resemble those of the noble tree called the *Robin'ia* or False Acacia.

47. PURPLE MOUNTAIN ASTRAGALUS—*Astrag'alus hypoglot'tis.*

Dry, open, mountainous heaths, where the soil is sandy or calcareous. Less frequently upon the sea-coast. Rare, and chiefly in the north. In profusion among sheep-pasture in the "Den of Invermay," a few miles south-west of Perth. Fl. June, July.

E. B. iv. 274; Baxter, vi. 453.

48. ALPINE ASTRAGALUS—*Astrag'alus alpi'nus.*

"Crowns the summit of Craigindal, a hill about 3,000 feet high, in the vicinity of Ben Avon and Ben-na-Bourd, on the Braemar mountains, in two or three localities, on a very pure and compact felspar." The only locality in Britain. Fl. summer.

E. B. Supp. ii. 2717.

49. COMMON BIRD'S-FOOT—*Orni'thopus perpusil'lus.*

Dry waysides, in old stone-quarries, upon green hills, amid short grass, and upon lawns; common, except in Scotland. Fl. June—Aug. Annual.

Curtis, ii. 417; E. B. vi. 369; Baxter, v. 358.

50. ARTHROLOBIUM—*Arthrolo'bium ebractea'tum.*

Sandy places near the sea; very rare. Channel Islands. Scilly Islands. Fl. spring and summer. Annual.

E. B. Supp. iii. 2844; Baxter, vi. 509.

51. TUFTED HORSE-SHOE-VETCH—*Hippocre'pis como'sa.*

Dry chalky fields and banks, and upon limestone rocks and crags: not rare in the southern counties, north-west Yorkshire, and other parts where the soil is calcareous. Not found in either Scotland or Ireland. Fl. May—August.

E. B. i. 31; Baxter, v. 369.

52. Saint-foin—*Onob'rychis sati'va.*

Often cultivated for fodder, in chalky and gravelly soils, and occasionally seen half-wild in ploughed fields, the seeds casually brought with those of the crop, or deposited from former plants similarly introduced. Possibly indigenous in the south. Fl. June, July.

E. B. ii. 96 (as *Hedysa'rum Onob'rychis*); Baxter, ii. 134.

A plant of remarkable beauty, known immediately by its pinnate leaves and large cones of crimson flowers, supported on long axillary peduncles, and resembling those of the *Or'chis pyramida'lis.*

53. Pencilled Wood Vetch—*Vi'cia sylvat'ica.*

Woods, cloughs, and hedges, where rather damp and shady, chiefly in the north of England. Abundant in many of the Cheshire *vallombrosas.* Winsford. Cotterill Clough. Fl. July, August.

E. B. ii. 79; Baxter, iii. 173.

A charming ornament for a garden hedge, though, in its native woods, one of the most shy as well as most lovely of our native plants.

54. Purple-tufted Vetch—*Vi'cia Crac'ca.*

Hedges and by waysides, where there is anything suitable for its grasp, and more especially in hay-fields; abundant everywhere. Fl. June—August.

Curtis, ii. 346; E. B. vii. 1168.

A lovely object among the mowing-grass in high summer, and, however scanty, never lost in its many-tinted fantasy and sweet profusion. When in hedgerows, the deep violet and blue racemes, delicately pinnate and tendrilled leaves, and slim and fragile stems, seem to float in the air rather than to have risen from the earth, The legumes, which are light-brown, are produced in abundance, and ripen at the time of the blooming of the wild hop.

55. Fodder Vetch—*Vi'cia sati'va.*

Common in ploughed fields, and sown as "fitches" for the food of horses, between the first and second cuttings of red clover. Wild in waste places, among grass and bushes. Fl. May—Sept. Annual.

E. B. v. 334 (the wild form of the plant.)

56. Narrow-leaved Crimson Vetch—*Vi'cia angustifo'lia.*

Hedgebanks, green hillocks, dry, heathy places, and by waysides; common. Often very fine near the sea. Fl. June—September. Annual.

E. B. Supp. i. 2614.

The differences between this and the fodder-vetch are too slight to render it probable that they are really distinct. It is almost certain that the fodder-vetch is no more than a luxuriant form of the *angustifo'lia.*

A still smaller form, generally quite procumbent, has been distinguished under the name of *Vi'cia Bobar'tii* (E. B. Supp. i. 2708.)

57. PEA VETCH—*Vi'cia Lathyroi'des.*

Dry banks and borders of fields, chiefly upon gravel and chalk; not uncommon. Occasionally on saline and grassy flats near the sea. Plentiful upon the south coast of Kent, and at Churchtown, about a mile from Southport, Lancashire, growing with the *Trifo'lium arven'se.* Fl. April—June. Annual.

E. B. i. 30.

58. ROUGH-PODDED YELLOW VETCH—*Vi'cia lu'tea.*

Waste, dry, stony places, chiefly near the sea, and sometimes quite upon the beach; very rare, and probably not wild. Fl. June—August.

Curtis, iii. 516; E. B. vii. 481.

59. HAIRY-FLOWERED YELLOW VETCH—*Vi'cia hyb'rida.*

Glastonbury Tor Hill, Somersetshire. Swan Pool, near Lincoln. Fl. June, July.

E. B. vii. 482.

60. COMMON HEDGE VETCH—*Vi'cia se'pium.*

Everywhere on hedgebanks, and by waysides, where sheltered. Fl. May—July.

E. B. xxii. 1515.

Readily distinguished among the vetches by its axillary clusters of 4—6 nearly sessile flowers, of a dull reddish purple colour, which changes to blueish when they are overblown, and by the leaflets gradually decreasing in size towards the upper extremity of the leaf. It is the only native species of the *Leguminosæ* which consorts habitually with dead-nettles, hedge-mustard, and other plebeians.

61. BITHYNIAN VETCH—*Vi'cia Bithyn'ica.*

Bushy places, copses, and dry hedgerows, upon limestone or gravel, and principally near the sea; rare, and perhaps confined to the south-western counties. Somersetshire, in several places. Fl. May—July.

E. B. xxvi. 1842.

62. COMMON TARE—*Er'vum hirsu'tum.*

Cornfields and upon moors; very common, and equally unattractive. Fl. June—August. Annual.

Curtis, i. 54; E. B. xiv. 970; Baxter, v. 322.

Like most pests of the farmer, extremely prolific of seed. The "tares" of the New Testament are believed to have been a species of grass, the *Lo'lium temulen'tum.*

63. SMOOTH-PODDED TARE—*Er'vum tetrasper'mum.*

In similar situations, but less frequent. Fl. June, July. Annual.

Curtis, i. 55; E. B. xvii. 1223.

A slender variety of this plant, with rather more seeds in the legumes, has been distinguished as *Er'vum gra'cile* (E. B. Supp. iv. 2904.) It appears to be confined to the extreme south, and is found chiefly near the sea.

Many botanists now include the Tares in the genus *Vi'cia*, calling them *Vi'cia hirsu'ta* and *Vi'cia tetrasper'ma.*

64. Leafless Yellow Pea—*Lath'yrus Aph'aca.*

Sandy and gravelly fields, especially upon their borders; occasionally among corn; rare, and almost confined to the south of England.—Hedgebanks of the New Road, Evesham, Worcestershire, abundant every year. Fl. June—August. Annual.

Curtis, iii. 343; E. B. xvii. 1167.

65. Crimson Grass Vetchling—*Lath'yrus Nisso'lia.*

Grassy borders of fields, and in dry thickets, supporting itself among leafy vegetation, chiefly upon limestone; rare in England, and in Scotland and Ireland unknown. Fl. May, June. Annual.

Curtis, ii. 415; E. B. ii. 112.

66. Rough-podded Pea—*Lath'yrus hirsu'tus.*

In ploughed fields; very rare. Somersetshire. Essex. Fl. July. Annual.

E. B. xviii. 1255.

67. Yellow Vetchling—*Lath'yrus praten'sis.*

Borders of fields, hedges, thickets, and bushy places, abundant everywhere. Very frequent in meadows, among the mowing-grass. Fl. June, July.

Curtis, i. 180; E. B. x. 670.

An untidy, but sprightly and pleasing flower, immediately known by its clusters of 8—10 gamboge-yellow corollas, mostly looking one way, and supported on axillary peduncles of 3—5 inches in length. The stems branch into abundance of leafy shoots, and the stipules are nearly as large as the leaflets. The legumes are black and glabrous.

68. Tuberous-rooted Pea—*Lath'yrus tubero'sus.*

Hedges and fields at Ongar and Fyfield, Essex. Fl. July, August.

Bot. Mag. iv. 111.

69. Wild Everlasting-pea—*Lath'yrus sylves'tris.*

Groves, thickets, and moist hedges, chiefly where the soil is calcareous, and principally in the south of England. Abundant in many places near Bristol. Fl. June—August.

Curtis, ii. 416; E. B. xii. 805.

The fine crimson-rose-coloured and opulent "Everlasting-pea" of every garden (the *Lath'yrus latifo'lius* of E. B. xvi. 1108, and Baxter, ii. 117.) is probably a luxuriant form of the *sylves'tris*, induced by cultivation. The only marked difference is in the width and general outline of the leaflets.

70. Blue Marsh Pea—*Lath'yrus palus'tris.*

Moist, boggy fields and damp thickets; rare. Fl. July, August.

E. B. iii. 169.

71. Seaside Pea—*Lath'yrus marit'imus.*

Pebbly sea-beaches; chiefly in the east and south of England. Abundant between Aldborough and Orford, Suffolk, covering many acres upon a long peninsula of sand and pebbles. In profusion also near Kingsdown, Kent, about a mile from Walmer. Fl. July, August.

Curtis, iii. 517; E. B. xv. 1046; Baxter, iii. 225 (all as *Pi'sum marit'imum.*)

72. Common Bitter-vetch—*Or'obus tubero'sus.*

Thickets, such as the wood-anemone delights in; borders of dry fields, hedgebanks that look sunwards, railway slopes, margins of dry woods, &c.; common everywhere. A sweet and prompt spring-flower.

Curtis, i. 53; E. B. xvii. 1153; Baxter, vi. 433.

In every successive stage of spring there are a number of flowers that come together, and go away together, and are constant friends. The Orobus is one of them, making its entry with the primrose and the sylvan hyacinth in that beautiful season when the trees, though green, afford no shade, and none is desired. The spring leaves have generally only *two* pairs of leaflets; those that come in autumn have *three* pairs, and with these there is often a new though scant supply of flowers, pleasing as one of the innumerable illustrations of nature's intense love of Rejuvenescence, and her capacity for it. (See "Life, its Nature, Varieties, &c.," chap. xx., Ed. 2.) Individuals may be found at all seasons, with the leaflets extremely narrow. These were formerly thought a species, and called *Or'obus tenuifo'lius.*

73. Black Bitter-vetch—*Or'obus ni'ger.*

Subalpine woods in Perth and Forfarshire; the only localities in Britain. Fl. July, August.

E. B. Supp. iii. 2788.

Not uncommon in gardens.

74. White Sylvan Bitter-vetch—*Or'obus sylvat'icus.*

Mountainous woods, loving the neighbourhood of water; not rare. North Wales, the north of England, and Scotland, frequent. Banks of the Clyde, fringing the rocks near the cascade called the *Corra Lyn.* In Ireland rather uncommon. Fl. May, June.

Curtis, iii. 515; E. B. viii. 518.

The Leguminosæ grown for ornament and economic use amount to hundreds. Provender and fodder for cattle are supplied by the ten or twelve native or naturalised species mentioned above, comprising clovers, trefoils, and medicks in different kinds, vetches, saintfoin, and occasionally melilot and lucern, with the ripe seeds of the horse-bean or *Fa'ba equi'na.* The culinary species include the common "green pea" or *Pi'sum sati'vum,* in many varieties; the top-knot pea or *Pi'sum como'sum;* the common broad or Windsor bean, botanically *Fa'ba vulga'ris,* remarkable for the black spot on its white flowers; and the two species of French bean—the dwarf, with long, straight, and narrow pods, (*Phase'olus vulga'ris*) and the climbing or scarlet runner, with broad and curved pods (*Phase'olus multiflo'rus.*) Liquorice, or *Glycyrrhi'za gla'bra*, is cultivated at Pontefract, for the sake of the sweet juice contained in its long and whip-like roots. The leaves of this plant are large and pinnate.

Those esteemed for decorative purposes are represented under every known form of shrub and herbaceous plant, and in several very handsome and well-marked trees. Of the latter, the commonest and deservedly-most-popular is the Laburnum or "golden-rain," immediately distinguished by its trifoliolate leaves and innumerable streaming tresses of dark-pencilled yellow flowers, which in autumn are succeeded by clusters, nearly as copious, of dingy legumes. The Scotch Laburnum, or *Cyt'isus alpi'nus*, differs from the common one in its larger and more glossy leaves, and in flowering two or three weeks later. The clusters of unripe pods are frequently so yellow as at a distance to resemble a second shower of blossom. A variety of the common Laburnum, called *purpuras'cens*, has flowers of a rosy-lilac colour. Next to the Laburnum in frequency, is that most admirable tree commonly known as the Acacia, but the proper name of which is *Robin'ia*. Abundance of large pinnate leaves, composed of 8—10 pairs of oval and glabrous leaflets; stipules changed into great brown thorns, an inch in length, and pendulous racemes of fragrant white flowers, distinguish it in a moment from every other inmate of the garden. The only tree bearing a near resemblance to the Acacia is the rare and seldom-flowering *Virgil'ia lu'tea*, the leaves of which, upon young individuals, are often 12—18 inches long. The *Sopho'ra Japon'ica*, a tree rising 30—40 feet high, but seldom seen north of London, likewise has pinnate leaves, but of a peculiar dark blueish green. The flowers, which are rarely produced, are small and cream-coloured, and come in autumn. The Judas-tree, or *Cer'cis Siliquas'trum*, is remarkable for its large and circular leaves, 1½—2 inches across, petiolate, and with deep-red veins; and for putting forth its delicate pink flowers from wood at least a year old. In the south of England the Judas-tree is grown as a standard, and occasionally ripens pods, which are eight inches long; in the north it requires to be placed against a wall, where it will be somewhat screened from the cold. The three thorned Acacia, *Gleditsch'ia triacan'thos*, is not less remarkable for the intense variety in the form of its leaves. Some are simply-pinnate, with 10—12 pairs of leaflets; others shoot out pinnate wings in place of leaflets—here and there, at the base of the leaf, half-way up, at the tip, upon the right hand side or upon the left, just as it may happen; others, always the fewest, are doubly-compound to the fullest extent. The thorns of this singular tree are usually 2—3 inches long, with smaller ones sprouting from their sides; the flowers are inconspicuous and seldom produced. One other only needs mention, the very curious *Gymnocla'dus Canaden'sis*, a thorny and deciduous tree, with upright branches that terminate in thick, blunt points, and are to appearance wholly destitute of buds, looking as if dead. While young, the branches grow erect; afterwards they twine themselves about the neighbouring trees and shrubs. The leaves, which are bipinnate, are, upon young individuals, 3 feet long and 20 inches wide; the flowers are white, diœcious, in spikes 2—3 inches long, and are followed by large scimetar-shaped pods. Climbers, among the woody Leguminosæ, so far as cultivated in England, attain perfection in the incomparable *Wista'ria.* The massive lilac racemes hang among the great pinnate and silky leaves like bunches of grapes, and though ordinarily in the north needing the shelter of the green-house, are produced freely in the open air, in fine seasons, even in Lancashire.

The ornamental hardy Shrubs with papilionaceous flowers comprise numerous species of *Cyt'isus, Spar'tium, Caraga'na, Genis'ta,* and many others. The two best-known of these are the fine old-fashioned "Spanish broom," or *Spar'tium jun'ceum,* with golden flowers an inch in breadth, upon long, erect, slim branches resembling rushes; and the white-flowered "Portugal broom," or *Spar'tium multiflo'rum,* every spray of which swarms, for the length of a cubit, with little ivory and nearly sessile corollas. Grafted upon the Laburnum, (as this plant often is near Paris) a combination is produced remarkable alike for beauty and singularity. *Genis'ta radia'ta* is remarkable for its opposite and trifoliolate leaves, which resemble whorls of six linear ones. *Cyt'isus sessilifo'lius* is densely clothed with little cordate leaves. *Amor'pha frutico'sa* has pinnate leaves formed of numerous small leaflets, and long close spikes of rich and very dark blueish-purple flowers, produced at midsummer. *Anthyl'lis Bar'ba-jo'vis,* shining with silky foliage and producing lovely yellow clusters, is one of the most beautiful shrubs that can be planted against a wall that faces the sun. Among the dwarf species of this class, none are more curious or interesting than the *Genis'ta sagitta'lis* and the *Genis'ta trique'tra.* The former is remarkable for its articulated appearance; the latter, for its winged and triangular green shoots, which, in early summer, are crowded, like the *sagitta'lis,* with yellow flowers. Various kinds of *Ono'nis* and *Astrag'alus,* and the *Medica'go arbo'rea,* with legumes curved into a flat ring, like a quoit, are found in choice gardens. The bladder-senna, or *Colute'a,* is almost universal in shrubberies, and beautiful alike when loaded to its full height of seven or eight feet, with yellow flowers, and when these are succeeded by its very singular inflated legumes.

The readiest clue to many of the herbaceous Leguminosæ is often found in the Leaves. Lupines, for instance, now cultivated to the number of 20—30 species, are known by their digitate leaves. The bitter-vetches, which are species of *Or'obus,* have pinnate leaves, with the rudiment of a tendril instead of a terminal one. The most pleasing of these is the *Or'obus ver'nus,* which opens its purplish racemes as early as March, and has about two pairs of large elliptical leaflets to every leaf. Leaves formed of only two leaflets, and a tendril between them, indicate the peas in their various kinds,—as the Everlasting-pea or *Lath'yrus latifo'lius,* the common Sweet-pea or *Lath'yrus odora'tus,* the Tangier-pea, the azure-blue pea or *Lath'yrus azu'reus,* and the *Lath'yrus grandiflo'rus,* the great red flowers of which are the largest produced by any hardy herbaceous plant of the family. The Saw-vetch or *Biser'rula,* the French-honeysuckle or *Hedysa'rum,* and many others, are interesting more particularly in their pods.

In green-houses, the most conspicuous are the *Aca'cias,* charming Australian shrubs and trees, decked in spring with innumerable yellow globes the size of a pea, often exquisitely fragrant, and borne in every variety of inflorescence, from the solitary and axillary up to immense panicles that float in the air like golden clouds. The globes are not solitary and individual flowers, but heads of numerous very small ones, sessile, and in shape rosaceous, as plainly seen in the unopened buds. The *chenille* appearance which they present when fully expanded comes of their very numerous stamens. The latter quite conceal the almost microscopic perianths, and are often unaccompanied by pistils. When pistils are developed, many species ripen abundance of long, brown, thin, and pendulous legumes. The foliage of the Acacias is nearly as various as the inflorescence, varying from needle-shaped "phyllodia," (or petioles that supply the place of leaves) up to the most elaborate doubly-pinnate. The commonest in cultivation is the *Aca'cia arma'ta*, a shrub, sometimes only a foot high, with abundance of lanceolate phyllodia, an inch and a half long, and solitary and axillary globes of flowers, copiously produced on the upper portion of the branches. When tall, and the great leafy racemes are out, this is a strikingly handsome plant. The *Aca'cia Lophan'tha* is also very common, and may easily be known by its large doubly-compound leaves, and rather few heads of yellowish-green flowers, with stamens nearly an inch long, and the individual flowers standing so far apart as plainly to indicate the real nature of the inflorescence. The *Aca'cia mol'lis* grows to be quite a tree, and, with some of the others, is sufficiently hardy to bear the open air in situations where the climate is mild. Near Beaumaris, there is a plant of it in the angle of a house facing the water, probably not less than twenty feet high. Nothing can be more lovely for a large conservatory than a collection of tall-growing Acacias with racemose or panicled inflorescence. They saturate the whole atmosphere with honied odour, and overhead diffuse floods of golden brightness.

Next to the Acacias come a multitude of pretty shrubs belonging to the genera *Choroze'ma*, *Pultenæ'a*, *Eutax'ia*, *Kenne'dya*, &c., mostly with simple, and often holly-edged leaves; and abundantly representing the papilionaceous part of the Flora of Australia and southernmost Africa. Many of them are climbers or twiners; some are rushlike and nearly leafless; very odd and unexpected mixtures of colour frequently occur in their flowers, especially in the *Choroze'mas*, and in many there is a dash of copper-brown, a colour elsewhere almost unknown. Some of this lovely race are hardy enough to live and blossom out of doors, at least in the south of England, such as the *Edwards'ia microphyl'la* and the *Edwards'ia grandiflo'ra* (Bot. Mag. v. 167.) from New Zealand, both of them handsome shrubs with delicate pinnate leaves, and racemes of bright yellow flowers. Among other half-hardy species of great beauty may be named *Podolo'bium triloba'tum*, (Bot. Mag. xxxvii. 1477.) with holly-like and leathery foliage; *Callis'tachys ova'ta*, (Bot. Mag. xliv. 1925,) with fine large spikes of yellow flowers; *Brachyse'ma latifo'lia*, (Bot. Mag. xlv. 2008.) a climber, with fine scarlet blossoms; and the *Mirbe'lia reticula'ta*, (Bot. Mag. xxx. 1211.) the flowers of which are lilac. Cassias, after the manner of the Eutaxia group, represent that portion of the tropical and trans-equatorial Leguminosæ which have flowers other than butterfly-shaped, yet not of the Acacia type. The two most beautiful of this genus are *Cassia Austra'lis* and *Cassia aversifo'lia*. (Bot. Mag. liii. 2638, 2676.) Mimosas resemble Acacias in their compound leaves and globular heads of flowers, which are usually, however, much larger than any that occur in the latter genus, and mostly lilac, pink, or white. *Poincian'as* (Bot. Mag. xxv. 995, lvi. 2884.) likewise have doubly-compound leaves, but the matchless flowers, which are of a rich yellowish-scarlet, are nearly regular, with flat and spreading petals elevated upon little stalks, and the stamens hanging forwards in long tassels. *Lipa'ria vesti'ta* (Bot. Mag. xlviii. 2223.) has ovate and concave leaves, downy beneath, green upon the upper surface, and so remarkably imbricated upon the stem as to make it appear clothed with scale-armour. *Clito'ria Terna'tea*, (Bot. Mag. xxxvii. 1542.) an American climber, is remarkable for the intensely brilliant blue of its corollas. *Clian'thus puni'ceus* (Bot. Mag. lxiv. 3284.) has clusters of long crimson flowers resembling a turkey's wattle. The *Erythri'nas* or coral-trees (Bot. Mag. xlvii. 2161, l. 2431, &c.) are hung with magnificent red flowers like parrots' beaks. Notwithstanding all these splendours, certain little yellow-flowered shrubs, nearly allied to our native broom, are among the most interesting the green-house contains. *Cyt'isus racemo'sus*, *Genis'ta fra'grans*, and *Genis'ta Canarien'sis*, loaded with their cheerful bloom, never fail to please the lover of simple flowers.

LXVIII. THE SCLERANTHUS FAMILY.—*Sclerantha'ceæ.*

A family of about a dozen insignificant weeds, with minute and usually pentamerous green flowers, and narrow opposite leaves connected at the base. The stamens, which are usually five, fertilise a solitary and one-seeded ovary, enclosed in the tube of the perianth.

Two species grow wild in Britain; little pale-green much-branched plants, 2—3 inches high.

1. Annual. Lobes of the calyx pointed. COMMON ANNUAL SCLERANTHUS.
2. Perennial. Lobes of the calyx obtuse, and with a conspicuous white border. PERENNIAL SCLERANTHUS.

HABITATS AND DISTRIBUTION.

1. COMMON ANNUAL SCLERANTHUS—*Scleran'thus an'nuus.*

Sandy ground, both waste and cultivated; common. Fl. July, August. Annual.

E. B. v. 351; Baxter, vi. 439.

2. PERENNIAL SCLERANTHUS—*Scleran'thus peren'nis.*

Similar in habitat, but apparently confined to the eastern side of England, and not found in either Scotland or Ireland. Fl. summer.

E. B. v. 352.

LXIX. THE PLUM FAMILY.—*Amygdala'ceæ.*

Trees and shrubs, with simple, undivided, oval, or lanceolate leaves, usually serrated, and glandular towards the base; and flowers of five distinct petals, inserted, along with twenty or more stamens, on the rim of the calyx, which is cup-shaped and five-lobed, and encloses the free and solitary ovary. The urn-like shape and the smooth exterior of the lower half of the calyx sometimes cause it to be mistaken for an inferior ovary; but that it is really no more than calyx becomes apparent immediately that it is cut in half, downwards or upwards.

The ovary ripens into a "drupe," that is to say, a bony shell, enclosing the seed, itself being embedded in soft pulp, overlaid by a coloured and separable skin, as in the plum and the cherry. The flowers are white or lively pink, never blue, borne singly or in sessile umbels, and among the earliest to open in the spring, when the rude gusts often wrench away their petals as soon as spread, and strew the ground with them as if with snow.

Natives, almost exclusively, of the cold and temperate regions of the northern hemisphere. In those parts of the world, no family supplies civilised man with a greater variety of agreeable fruits, as witness the plum and cherry, already mentioned, (the former including the damson and the greengage) the peach, the apricot, and the nectarine, the whole, in short, of our "stone-fruits." Besides these, there are almonds, both sweet and bitter, different, as fruits, from the preceding, only in the large size or the nutty character of the seeds, and in the scantiness and uselessness of the exterior pulpy portion. Almost all the species contain amygdaline, the basis of hydrocyanic or "prussic" acid, stored either in the leaves or in the kernels. It is this which gives the peculiar flavour to the leaves of the common laurel, and occasions them to be used in making custards, and to which are referable the deadly properties of "laurel-water." It is the same secretion which recommends the kernels of stone-fruits for ratafia and other articles of confectionery. The bark, in several instances, yields gum, familiar in the oozings from the sores of plum-trees, and in the transparent tears of the garden cherry, hanging from the boughs like amber icicles. This gum differs, however, from that of the Acacia, called "gum-Arabic," being insoluble in cold water. It is properly "cerasin."

About a hundred species are known, three or four growing wild in Britain.

1. Flowers white, in axillary and pendulous racemes of 3—4 inches in length, and powerfully honey-scented. Fruit without "bloom," small, black, austere, and bitter. A small but graceful tree. BIRD-CHERRY.
2. Flowers white, in umbellate, nearly sessile, clusters of about 3—5, the peduncles at least an inch long. Leaves, when full-grown, usually drooping almost vertically, and usually with two little red warts upon the petiole, at the upper extremity. Stature often 30—40 feet. Fruit red, without bloom, austere and bitter. WILD CHERRY.
3. Flowers white, solitary or in pairs, nearly sessile, appearing either before the leaves, or while they are very young. A stiff, hard, much-branched, very thorny bush or small tree. Fruit covered with glaucous bloom, and excessively austere. BLACK-THORN OF SLOE.

HABITATS AND DISTRIBUTION.

1. Bird-cherry—*Cer'asus Pa'dus.*

Woods and hedges; common in the north of England, but in the south apparently not found. Rare also in Ireland. Frequent near Manchester. Fl. May, June.

E. B. xx. 1383.

2. Wild Cherry—*Cer'asus a'vium.*

Woods and thickets, especially on their borders; common, but in many cases very doubtfully indigenous, and probably often sown by the birds. Especially fond of the brows of steep, overhanging banks, where it can tower in its snowy pride. In profusion in some parts of Cheshire. Fl. April, May. Fruit ripe in August.

E. B. x. 706; Baxter, ii. 108 (both as *Pru'nus Cer'asus.*)

Two forms of the wild cherry are discriminated by many botanists—the tall and the dwarf. The tall-growing one rises to the height of 30—40 feet, and is destitute of branches for a considerable height above the ground. The dwarf one seldom exceeds eight feet in height, and has branches almost from the base. This latter it is proposed to distinguish as *Cer'asus auste'ra.* (E. B. Supp. iii. 2863.) From one or other have been derived all the garden kinds of cherry, whether white, black, or red-fruited.

3. Black-thorn or Sloe—*Pru'nus spino'sa.*

Hedges, rough and bushy wildernesses, and on the borders of woods, everywhere; its immaculate white flowers anticipating the leaves, and giving one of the first indications of the approach of spring.

E. B. xii. 842.

The fruit ripens best near the sea. At Clevedon, twelve miles south-west of Bristol, where the tops of the entangled bushes are shorn flat by the Channel winds, and storms sprinkle them with salt spray, not a flower seems to fail, the round plums, covered with beautiful glaucous "bloom," being well-nigh as plentiful as the leaves. In taste they disappoint us, being acid and austere. The plant takes the rather odd name of "*black*-thorn" from the circumstance of its leaflessness, usually, when the flowers open. A large variety, less spinous in the branches, and with fruit of greater size, and which has been by most botanists distinguished under the name of *Pru'nus insiti'tia,* (E. B. xii. 841.) generally has the leaves open simultaneously with the flowers. It is by no means so common as the ordinary black-thorn, and probably connects the *spino'sa* with the garden plum, usually distinguished as *Pru'nus domes'tica.* (E. B. xxv. 1783.) The relationship of all three is, without doubt, extremely close, difficult as it is to believe that the greengage and the *magnum bonum,* the wine-sour and the Orleans, can be other than patricians since the beginning.

When plums fall from the tree half-ripe, it is a sign and result of the decay of the kernel, through imperfect fertilisation of the stigma, or in consequence of the attack of grubs. Nature never continues to expend force when the prime object of her labours is neutralised.

Some authors place the cherries and the plums in the same genus. But cherries have their leaves "conduplicate," or simply folded flat, while in the bud; whereas in plums they are "convolute," or rolled inwards from the margins to the midrib.

The most beautiful and conspicuous of this family, among the species grown purely for ornamental purposes, are the almond, the laurels, and the double-blossomed cherry. The almond, or *Amyg'dalus commu'nis*, opens its pink flowers before the leaves, and is a charming decoration of our pleasure-grounds in March and April. In average seasons, even in the north of England, it ripens fruit plentifully, and much of it often remains upon the boughs till spring. The dwarf almond, or *Amyg'dalus na'na*, (Bot. Mag. v. 161.) a shrub with linear leaves, and solitary red or white flowers, which are sometimes double, is well adapted to mix with herbaceous plants. The double-blossomed cherry only wants perfume in order to rival the white rose. To the physiologist it is a tree of special interest, from the circumstance of the ovary being exhibited in the morphological condition of two minute green leaves. The Laurels are invaluable for their evergreen foliage, and scarcely less desirable in pleasure-grounds by reason of their copious racemes of fragrant white flowers. In the Portugal laurel, or *Cer'asus Lusitan'ica*, the racemes are *longer* than the leaves; in the common laurel, or *Cer'asus Lauro-Cer'asus*, they are *shorter*. The clematis-scented cherry, or *Cer'asus Maha'leb*, a native of Austria, is esteemed for its delightful odour. The flowers of this are borne in leafy and corymbose racemes, and the foliage somewhat resembles that of the apricot. The Virginian Bird-cherry, or *Cer'asus Virginia'na* seems disposed to naturalise itself in this country, and, with several other species, may be learned in arboretums.

LXX. THE LADY'S-MANTLE FAMILY.—*Sanguisorba'ceæ.*

Herbaceous plants, (except a few exotic undershrubs) with alternate and stipulate leaves, generally, when fully grown, on long petioles, but occasionally sessile, and either simple and fan-lobed, and plaited like a lady's fan, or *quasi*-pinnate; in the latter case often with many small intermediate leaflets. Perianth single, with a thickened tube, and a 3—4—5-lobed margin, the 4-lobed being most usual, and occasionally with four smaller leaves outside. Stamens either numerous or extremely few; ovary solitary; ovules 1—2; flowers sometimes unisexual. The blossoms being small and inconspicuous, they would often be passed by, were it not that the inflorescence is usually dense, and often capitate, rendering the plants in many cases extremely pretty. They grow in fields, upon heaths and in exposed places in most parts of the world outside the tropics, to the number of a hundred species or more, and are noted for their astringency.

Five occur wild in Britain, all with a 4-lobed perianth.

A.

Flowers unisexual and monœcious. Leaves very elegantly *quasi*-pinnate, with many pairs of roundish and serrated leaflets, and a terminal one. Stems 6—24 inches high, branched, glabrous, striated, and with a few leaves. Flowers collected in terminal, globular, greenish heads; the female flowers in the upper part of the heads; the males in the lower part, and the entire head sometimes of only one sex. Stamens 30—50, long and pendulous, and resembling tassels of buff-coloured silk. Pistils crimson and tufted.
1. SALAD BURNET.

B.

Flowers bisexual. Stamens not exceeding four.

a. Flowers deep purplish-red, in terminal and cylindrical spikes of about an inch in length, the upper flowers (which are often without stamens) expanding first; the lateral spikes shorter and nearly globular. Stems 2—3 feet high, branched at the upper part. Flower-stalks 6—12 inches long, and quite erect. Leaves large, several inches in length, *quasi*-pinnate; the leaflets oval and serrate, with smaller ones between.
2. MEADOW BURNET.

b. Flowers yellowish-green, minute, in terminal and sessile cymes, which often grow into large panicles. Leaves fan-veined and fan-lobed, the petioles of the lower ones 2—6 inches long; the upper ones sessile. Plant perennial. Fruit small, ovoid, and green.

Leaves green on both surfaces, the lobes 7—9, short, broad, and serrate. Branches 3—18 inches long or high.
3. COMMON LADY'S-MANTLE.

Leaves shining with white silvery hairs on the under side, the lobes 5—7, extending nearly to the base, oblong and almost entire. Branches 3—9 inches high. 4. ALPINE LADY'S-MANTLE.

c. Flowers yellowish-green, minute, in axillary and sessile tufts, almost concealed by the leaves, which are mostly sessile, nearly circular, and 3-cleft, the lobes wedge-shaped and deeply cut. Three of the four stamens usually absent. Plant annual. 5. PARSLEY-PIERT.

HABITATS AND DISTRIBUTION.

1. SALAD BURNET—*Pote'rium Sanguisor'ba.*

Dry, calcareous hills, and upon limestone rocks, perched on the driest spots, and frequently in bare earth upon the cliff-side. Common, except in Scotland. Fl. June, July.

Curtis, i. 137; E. B. xii. 860; Baxter, vi. 438.

The leaves have the taste of cucumber, whence the cultivation of the plant for use in salads. The position of the female flowers is remarkable and almost unique. Ordinarily, in monœcious plants, the pistilliferous flowers are lower down upon the stem or branch than the male ones, or at least *beneath* them, and the pollen from the latter, falling towards the earth, is intercepted. But here, as in the *Rici'nus,* the relative places are reversed.

A variety, larger in all its parts, and with a trifling difference in the condition of the perianth when the fruit is ripe, is by some botanists called *Pote'rium murica'tum.* Railway banks, Saffron Walden, plentiful.

2. Meadow Burnet—*Sanguisor'ba officina'lis.*

Moist, rich meadows by rivers, especially in the north of England and the south of Scotland. Abundant near Manchester. Not found in Ireland. Fl. August.

E. B. xix. 1312; Baxter, iv. 269.

3. Common Lady's-mantle—*Alchemil'la vulga'ris.*

Meadows and pastures, especially in subalpine districts, and near rivers. Common, except in the south. Extremely abundant near Manchester. Near Bristol almost unknown. Fl. May—September.

Curtis, iv. 588; E. B. ix. 597; Baxter, iv. 280.

The leaves, while young, are plaited, resembling a lady's half-opened fan, and hold drops of rain and dew in their folds and angles. The cold clear globules shine like spheres of light until we touch, when they slip away like quicksilver.

4. Alpine Lady's-mantle—*Alchemil'la alpi'na.*

Mountain-sides in the north of England and the Highlands of Scotland; abundant. Similar situations in Ireland; but rather rare. Fl. May—August.

E. B. iv. 244.

A large and strikingly beautiful variety, with the lobes of the leaves extending only about a third of the way down, and the under-surface resembling the finest white satin, is common in gardens, and is said to have been gathered wild upon the Clova mountains. Mr. Babington distinguishes it as a species under the name of *Alchemil'la conjunc'ta.* Nurserymen call it *Alchemil'la argen'tea.*

5. Parsley-piert—*Alchemil'la arven'sis.*

Cultivated and fallow fields, newly-made gardens in the country, and by waysides; common and insignificant. Fl. May—August. Annual.

E. B. xv. 1011.

Several species of *Sanguisor'ba* are cultivated in flower-gardens, especially the *Sanguisor'ba Canaden'sis,* the spikes of which are cream-coloured, and 4—5 inches long. *Ancis'trum* and *Acæ'na* are occasionally represented, and now and then some exotic species of *Pote'rium* are met with, as *Pote'rium cauda'tum.* (Bot. Mag. xlix. 2341.) The former have *quasi*-pinnate leaves, and are distinguished by their globular and many-barbed heads.

LXXI. THE APPLE FAMILY.—*Pomif'eræ.*

Trees and shrubs exclusively, the stems often spinous. Leaves alternate, stipulate, usually undivided, sometimes pinnate or pinnatifid, and generally serrate. Flowers regular; solitary, or in terminal clusters; crimson, pink, or white, but never blue; often highly fragrant, and copiously put forth in spring and early summer. Petals five, attached lightly to the rim of the calyx, on which part the numerous stamens are also seated. Ovaries 2—5, with the lower or tubular portion of the calyx adhering to them, and making it appear as if the upper portion, with the petals and stamens, were seated upon the summit, as really happens in epigynous flowers. In due time this *quasi*-inferior ovary ripens into a fleshy or succulent pome, having its most perfect example in the apple and pear, though sometimes not larger than a pea; the five free lobes of the calyx retain their original position; and owing to the distension below, form an "eye" or crest on the top. The simulation of the fruit of an epigynous flower now becomes so exact, that but for previous observations of the mode of growth, there would often be no perceptible difference. The carpels become either bony, as in the medlar, or of the texture of gristle or parchment, as in the apple and pear, every carpel containing, normally, a couple of erect ovules, which stand side by side. Sometimes, through abortion, there is only one ovary, with a solitary ovule, as in the hawthorn.

The Pomiferæ belong to the whole of the northern hemisphere, except the extremely cold parts, diminishing, however, as the south is approached. On the antarctic side of the equator, like many other northern families, they are entirely unknown. The fruits, which are in many cases of eminent value, comprise, in addition to the apple and pear, the quince and the medlar. The wood of the pear-tree and of the white-beam, and the mucilaginous seeds of the quince, bear further witness to the usefulness of the family.

The number of species is about two hundred, and of these, eight either grow wild or have become naturalised in Britain. The Service-tree or *Sor'bus domes'tica*, usually included in British Floras, has not the slightest claim to be reckoned indigenous.

A.

LEAVES SIMPLE AND WHOLLY UNDIVIDED.

1. Underside of the leaves covered with white cottony down. No spines upon the branches. Carpels of the fruit bony.

    Flowers cream-coloured, in large, handsome, and downy corymbs. Leaves broadly-elliptical, 2—4 inches long by 2 broad, serrated, and feather-veined. Usually a tree. 5. WHITE-BEAM.

    Flowers greenish-white or pale red; solitary, or few together, in short drooping racemes. Petals small and erect. Leaves about an inch long, elliptic-ovate, and entire. Styles 3—4. A shrub or low bush. 8. COTONEASTER.

(LEAVES SIMPLE AND WHOLLY UNDIVIDED.)

2. Leaves not remarkably white underneath; and when mature, usually green and glabrous on both surfaces. Trees.

Flowers solitary, nearly sessile, terminal, white or pinkish, and scentless; the petals undulated, and nearly circular. Leaves oblong-lanceolate, somewhat downy, acute, generally entire. Branches spinous when the tree is wild. Calyx-segments leafy, permanent upon the summit of the globular brown fruit, which is there flattened or almost concave, with the upper extremities of the very hard and bony cells exposed. 1. WILD MEDLAR.

Flowers clustered. Styles five. Fruit umbilicated at the summit. Carpels membranous and gristly. Leaves finely serrated when the tree is wild.

Flowers in sessile umbels, white, shaded with rose-colour, and slightly fragrant. Branches spreading, irregular, somewhat horizontal, and without spines unless while young. Styles combined at the base. Fruit rounded and with a cavity at the base, in which the peduncle is half-concealed. Seeds brown. 3. WILD APPLE.

Flowers in small corymbs, snow-white, the pedicels an inch long. Branches at first erect, then curved downwards, and pendulous; in the wild state more or less spinous. Styles distinct. Fruit "pear-shaped," tapering to the base.—Seeds black. Bloom all upon the outside of the mass of branches. 2. WILD PEAR.

B.

LEAVES MORE OR LESS LOBED OR DIVIDED, BUT NOT PINNATE.

1. Underside of the leaves white with cottony down, especially while young; the blade feather-veined, 3—6 inches long, and either lobed or with the lower half pinnatifid and the upper half undivided. Flowers cream-coloured, in large downy corymbs. Fruit red. Trees. 5. WHITE-BEAM (varieties.)

2. Leaves green and glabrous on both surfaces. Leaves variously feather-lobed and serrated. Flowers corymbose.

Leaves mostly (or at least on the young shoots) with *large, crescent-shaped and serrate stipules;* the blade 1—2 inches long, wedge-shaped at the base, and with 3—5 deep segments, which are blunt at the extremity. Branches with numerous lateral spines. Flowers white or pink, and very fragrant. Styles 1—3. Anthers pink while young; subsequently black. Fruit deep red. 7. HAWTHORN.

No stipules. Leaves broad or almost cordate at the base, with acute lobes. Flowers white. Styles 3—5. Fruit brown and spotted.
6. WILD SERVICE-TREE.

C.

LEAVES QUASI-PINNATE, glabrous, 4—6 inches long, with 5—9 pairs of serrate leaflets, and a terminal one at some distance. Flowers cream-coloured, in large and showy corymbs, and powerfully scented. Styles 3—4. Fruit globular, orange at first, afterwards scarlet. 4. MOUNTAIN-ASH.

HABITATS AND DISTRIBUTION.

1. WILD MEDLAR—*Mes'pilus German'ica.*

Hedges and thickets; chiefly in the south of England; rather rare, and probably not wild. Fl. May, June.

E. B. xxii. 1523; Baxter, vi. 493.

Varieties with enlarged and eatable fruit are common in gardens in the south, where the produce is regularly brought to market. In the north rather rare.

2. WILD PEAR—*Py'rus commu'nis.*

Hedges, and occasionally in woods, or solitary upon hill-sides; in every case probably a descendant from some cultivated tree. Fl. April, May.

E. B. xxv. 1784.

The wild pear occurs very generally in Europe, but scarcely appears indigenous in Great Britain. It is to cultivated pears precisely what the crab is to the apple.

3. WILD APPLE, or CRAB—*Py'rus Ma'lus.*

Hedges and thickets; common as far north as Morayshire, and probably a genuine ancient Briton. Rare in Ireland. Fl. April, May.

E. B. iii. 179.

Blossoming in company with the cowslip and the poets' narcissus, the wild apple presents one of the loveliest sights of spring. It is generally regarded as the origin of pippins, nonpareils, codlins, and all other varieties, named and nameless, of the incomparable fruit which poetry connects with Venus. Some, however, believe that the garden apples are derived from a distinct and exotic type, possibly not now in existence, and that these alone should receive the name of *Py'rus Ma'lus*, the crab being distinguished as *Py'rus acer'ba.* Worcestershire was famous for its apples in the reign of Henry III. In Herefordshire, there are orchards that were planted in the time of Henry VIII. The "*aurea mala*" of the ancients were probably not "oranges," but "golden pippins."

4. MOUNTAIN-ASH—*Py'rus Aucupa'ria.*

Woods, and upon banks of streams and rivers, where it can lean over the water, loving especially the rocky sides of little cascades; common both as a wild plant and introduced. Exposed mountain-slopes are still more congenial to it; in Forfarshire this beautiful tree is found at a height of 2,500 feet above the level of the sea, yet it flourishes upon the shore equally well. Fl. May, June. Fruit ripe in September, while the leaves are yet green.

E. B. v. 337 (as *Sor'bus Aucupa'ria.*)

Few trees exhibit two such strikingly different aspects of beauty as the mountain-ash, viewed in the spring and in the autumn. In May and June it is green, light, and graceful, and loaded with cream-coloured bloom, the exuberant joy of its youth; then for a time it is unattractive, and we almost forget it; in September it again becomes conspicuous, and with a magnificence of fruitage, first of deep orange-colour, and when ripe, of a rich vermilion, that attracts the most indifferent and incurious.

> "The mountain-ash
> No eye can overlook, when 'mid a grove
> Of yet unfaded trees she lifts her head,
> Decked with autumnal berries, that outshine
> Spring's richest blossoms."

The berries of the mountain-ash are perfectly harmless, and in northern Europe and Scotland are made into a kind of conserve.

5. WHITE-BEAM—*Py'rus A'ria.*

Woods, chiefly upon limestone; not rare, except in Scotland. Leigh Woods, near Bristol, plentiful. Fl. May, June.

E. B. xxvi. 1858.

Very common in shrubberies and large pleasure-grounds, which, as well as its native woods, it ornaments almost as greatly as the mountain-ash, especially in September, when the leaves turn yellow, and the boughs are loaded with red fruit.

Two well-marked varieties occur: one with the leaves serrate at the upper part, and pinnatifid at the lower, called *Py'rus pinnatif'ida;* (E. B. xxxiii. 2331.) the other with the leaves deeply lobed, but not pinnatifid, called *Py'rus interme'dia.* The pinnatifid variety is common in ornamental grounds and plantations, and is much noticed in spring from the whiteness of its opening leaves. The *interme'dia* is said to grow wild in the island of Arran.

6. WILD SERVICE-TREE—*Py'rus tormina'lis.*

Woods and hedges in the southern and midland counties; rare. Isle of Wight. Epping Forest. Malvern Hills. Not found in either Scotland or Ireland. Fl. May, June.

E. B. v. 298 (as *Cratæ'gus tormina'lis*); Baxter, ii. 111.

The common or cultivated Service-tree (*Py'rus domes'tica,* E. B. v. 350.) resembles the mountain-ash, both in foliage and habit of growth, but attains a more considerable size. The fruit is pear-shaped, about an inch in length, greenish-brown when ripe, but not eatable until mellowed like the medlar.

7. HAWTHORN—*Cratæ'gus Oxyacan'tha.*

Woods and cloughs, hill-sides and open breezy downs; extremely common, and in hedges, (for which it is invaluable) universally. Fl. May, June.

E. B. xxxv. 2504 (as *Mes'pilus Oxyacan'tha*); Baxter, ii. 118.

The odorous flakes of bloom are that lovely and well-known "May," which, in early summer, so sweetly dapples every hedgerow. In hedges, however, through the clipping and imprisonment, though the flowers lose none of their beauty, the true figure and physiognomy of the plant are entirely lost. It is only when standing independently, as in a park, or on a lawn, or in the open spaces of a wood, where it can spread its branches freely, and form the large round head characteristic of the species, that its natural altitude and symmetry are attained, and then it is often one mass of snowy blossom, and the very perfection of a canopy for a rustic seat. A finer picture was never drawn, even by Burns, than when he placed his "youthful, loving, modest pair"

> "Beneath the milk-white Thorn that scents the evening gale."

The pink-flowered hawthorn, one of the most beautiful trees in cultivation, the double-flowered, and the variegated-leaved, all common in gardens and shrubberies, are varieties of the *Oxyacan'tha*. A bough of the first-named often vindicates the original nature, by producing *white* flowers, making it appear as if a piece of the common wild "May" had been thrown among the branches. With the accession of colour, and the multiplication of the petals, it is not unusual, however, for the flowers to lose their scent; in these varieties it is noticeable also that the large and handsome stipules of the wild plant often cease to appear, or drop away prematurely.

In Cheshire, the country children call the opening buds of the hawthorn "bread and cheese," and in Scotland the young shoots bear the name of "ladies' meat." Old stems and branches are a favourite abode of that brilliant lichen, the *Parme'lia parieti'na*, which encrusts them with rough and flaky gold. Gray and black lichens not seldom keep it company, hanging in tatters, or forming crisp and fringy patches.

8. COTONEASTER—*Cotoneas'ter vulga'ris.*

Upon the celebrated limestone promontory above Llandudno, called the Great Ormeshead; chiefly upon the cliffs south-west of the copper-mine; formerly plentiful, but now becoming scarce. Fl. May, June.

Curtis, iv. 616; E. B. Supp. ii. 2713; Baxter, vi. 402.

The garden species of Pomaceæ comprise, in addition to those named above, a great number of ornamental shrubs and trees, and a few others esteemed for their fruit. The chief of the latter are the quince and the Siberian-crabs. The quince, or *Cydo'nia vulga'ris*, is remarkable for the great size of the permanent calyx, which forms the crown upon the summit. Siberian-crabs (the produce of the *Py'rus prunifo'lia* and *Py'rus bacca'ta)* are distinguished by their long peduncles, and the cherry-form of their abundant little apples The fruit of the *Eriobo'trya Japon'ica*, or Loquat-tree. from Japan, is yellow and downy, and the size of a large gooseberry. Requiring, however, the atmosphere of a hot-house in order to ripen, it is in this country rarely seen. The leaves are large and evergreen; and the white flowers grow in terminal panicles.

None of the species grown for purely ornamental purposes surpass those beautiful small trees, the various kinds of Thorn. These, to the number of nearly fifty species, belong to the genus *Cratæ'gus*, (the same which comprehends the common English May) and are distinguished alike by their spines, their deeply-lobed leaves, and their corymbose white flowers, produced early in the season, and followed by abundance of deep-coloured fruit. Yet they are not the first. The earliest of the family to open its flowers is the well-known and brilliant *Py'rus Japon'ica*. The large crimson or blush-coloured corollas come in March, while the leaves are unexpanded, and give a wonderful splendour to the walls of houses even in towns. The *Pyracan'tha*, also trained against walls, is equally common, and remarkable for its abundant clusters of orange-red berries. They last, along with the leaves, throughout the winter, and make a house-front look quite cheerful. *Cotoneas'ters* have solitary pink flowers, almost hidden among the foliage, except the common *Cotoneas'ter microphyl'la*, a stiff and sturdy little bush, with leaves so diminutive as to seem quite out of place upon branches so thick and woody. The innumerable flowers are white and star-like, resembling those of the barren-strawberry, and are succeeded by crimson berries that look like drops of blood. When planted against a wall, the Cotoneaster rises to the height of 9—10 feet. Early in spring come also the abundant and snowy racemes of the *Amelan'chier*, a small but very interesting tree, with elliptical or oval leaves, that in autumn become stained with the most vivid scarlet, while, in the uncoloured portions, they are still as green as when they crept into the air in April. *Photin'ia serrula'ta*, (Bot. Mag. xlvii. 2105.) and *Photin'ia arbutifo'lia*, are very handsome half-hardy shrubs, with lanceolate and shining leaves. *Mes'pilus grandiflo'ra* is almost as common as the pink-flowered May. *Raphiole'pis*, in two or three species, is called the "Indian-hawthorn." *Py'rus spectab'ilis*, or the "Chinese-apple," (Bot. Mag. viii. 267.) a very showy tree, is remarkable for its large and elegant semi-double flowers, which at first are of a deep rose-colour, though afterwards becoming paler. *Py'rus corona'ria*, or the Garland-crab, (Bot. Mag. xlv. 2009.) has white flowers that turn purple before they fade, and exhale the odour of violets. This beautiful tree, green nearly throughout the year, is said to be partially naturalised in woods near Godalming.

LXXII. THE ROSE FAMILY.—*Rosa'ceæ.*

Chiefly perennial herbaceous plants, only a few genera being shrubby, and scarcely any species arborescent. Stems in the shrubby kinds often armed with acute and curved prickles, which extend to the petioles, to the under-side of the veins of the leaves, and to the peduncles, and are sometimes so densely crowded as almost to hide the bark. Leaves alternate; usually provided with large and leaf-like stipules; either simple and undivided, ternate, *quasi*-digitate, or pinnatifid; or compound, and then either pinnate or somewhat quinate. Many, like the *Sanguisor'bas* in the Lady's-mantle family, have the leaves "interruptedly-pinnatifid," little and large lobes standing alternately, as represented in Fig. 115. Flowers regular; usually pentamerous; sometimes with four or eight petals, or casually with six. Calyx ordinarily five-lobed; sometimes ten-cleft, or, when the petals are only four, eight-cleft: in the ten-cleft ones, the pieces are alternately large and small, giving the semblance of an inner and outer calyx. Petals seated on the calyx, in outline frequently heart-shaped, and in many cases crumpled. Stamens 20—100, rarely so few as 5—10, springing, like the petals, from the calyx, and curved inwards while young; the ovaries equally numerous and free. In the true roses the calyx is tubular and urn-shaped at the lower part, enclosing the ovaries and the bases of the styles, while the upper part spreads into five, often pinnatifid, divisions, making it appear as if these latter alone were the actual calyx; and as if, along with the petals and the stamens, they were perched upon the summit of a solitary and inferior ovary. On making a vertical section, it becomes evident that there are many ovaries lying concealed within the lower or urn-half of the calyx, and that the apparently-single style is a consolidation of many styles, struggling through the narrow neck of the urn, a short distance above which the stigmas are seen free, or very nearly so. (Fig. 117.)

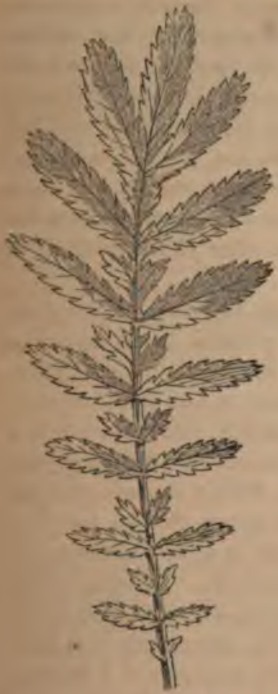

Fig. 115.
Leaf of Silverweed.

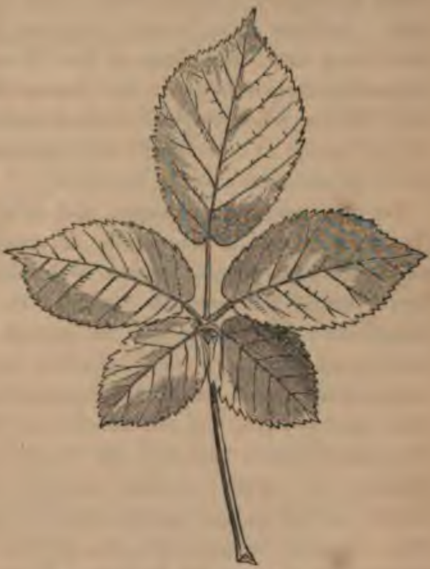

Fig. 116.
Leaf of Bramble.

The fruits of the Rosaceæ are diversified very curiously. The *Spiræ'as* have diminutive, whorled, and many-seeded follicles. The ovaries of the rose become small, dry, hard, and hairy achenia, the urn-like half of the calyx, which constitutes their permanent envelope, becoming succulent and red or black, and forming, with them, a "hip" or "cynarrhodum." In the strawberry the receptacle swells enormously while the ovaries are ripening, and forms a pulpy cushion, upon which they are elevated, studding its surface as if with minute yellow seeds. In the blackberry and the raspberry the receptacle remains dry, but enlarges into a white and spongy cone, the ovaries now taking their turn to become distended, and crowding it in the shape of juicy little beads or "drupeolæ," which adhere where they touch. Lastly, in the cinquefoils and their immediate allies, both the receptacle and the ovaries remain dry, as if the raspberry had exchanged its juicy grains for the hard and bony achenia of the strawberry, the succulence being altogether or nearly dispensed with. In these latter it often happens that the carpels are provided with hairy tails, like those of the *Cle'matis* and the pasque-flower, suggesting comparison with the Ranunculaceæ; as the *Spiræ'as* do in their follicles, when we think of the columbine and larkspur; and as the *Potentil'las* do, in their heads of dry achenia, when placed alongside of the wood-anemone and the crowfoot.

The prickles of the Rosaceæ, that is to say, of roses and brambles, (the only genera of this family in which prickles occur) are quite a different thing from the spines of the sloe and the thorns of the berbery. Shrubs and trees are "armed" in three or four different ways. Sometimes a twig ceases from its onward growth, and tapers off to a sharp point, forming a spear, which is continuous with the stem, and inseparable from it, except by amputation. This is the case with the sloe, the hawthorn, and the members of the genera *Pru'nus* and *Cratæ'gus* generally, as well as in the *Ono'nis;* and to spears of such origin the name of "spine" is alone properly applicable. In other plants Leaves have their development arrested, the woody matter that would have composed the skeleton, or a portion of it, contracting into acute needles like those of the berbery. These are examples of "thorns," properly so called; the stipules of the *Robin'ia*, and the thorns of that vegetable hedgehog, the furze-bush, coming under the same general idea and denomination. The thorns along the edges of such leaves as those of the chesnut are very little different, being prolongations of the superabundant woody matter of the skeleton. But in the prickles of roses and brambles, we no longer have organic connection with the subjacent woody tissues of the plant. The weapons of these shrubs are simply hairs, grown immensely thick and strong, attached no deeper than the surface of the skin or bark, over which they are scattered, and separable by mere pressure on one side, when they fall away, and leave only a little scar. (Fig. 118.) In other words, prickles are superficial, and may be torn away or pushed off with the finger; while spines and thorns are seated in the very substance of the plant, and can only be removed by fracture or with the knife.

The peculiarly elegant and symmetrical form of the flower in the normal Rosaceæ, is the ground of the term "rosaceous," as applied to corollas. None give prettier examples of it than the cinquefoils, which in this respect bear further resemblance to ranunculaceous plants, and to buttercups especially. They are immediately distinguished by their stamens being adherent to the calyx, those of the Ranunculaceæ springing direct from the receptacle. As soon as the blooming is over, the difference becomes still more obvious, the calyx being cast off by the buttercup, and by most other Ranunculaceæ, while in the cinquefoils it not only remains attached, but continues green.

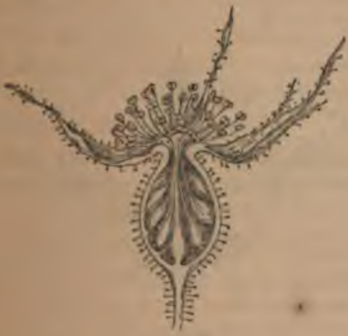

Fig. 117.
Section of Rose blossom (the petals omitted.)

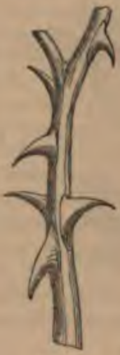

Fig. 118.
Prickles of Rose.

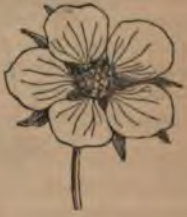

Fig. 118.
Rosaceous corolla.

The flowers of the Rosaceæ are prone to become double. Many species have highly fragrant blossoms. The predominating colours of the petals are red, white, and yellow. Blue is altogether unknown. Two or three species are unisexual by imperfect development.

In autumn the foliage often assumes a brilliant colour, especially remarkable in the common bramble, which emulates the crimsoned maples of North America. The leaves of the wood-strawberry turn scarlet, and those of the silverweed yellow or pink, each plant beautifully playing its little part in that cheerful euthanasia which we are apt to think peculiar to deciduous Trees.

Five hundred Rosaceæ have been discriminated, the great mass of them belonging to the temperate and cold countries of the northern hemisphere. They are remarkable alike for the delicious flavour of the fruits of several species; for the fragrance of the leaves of one or two others; for the frequent beauty of their flowers; and for the very general presence of an astringent principle. A few are emetic and anthelmintic, but not a single discovered species is deleterious. Many botanists make the family much more comprehensive than it is represented here, including in it the Apple, the Plum, and the Lady's-mantle families. These three families and the Rosaceæ are considered, by the authors in question, as sections only of one great family, and in the abstract no doubt they are correct. But, for practical purposes, it is best to adopt the course by which characters can be most simplified, and the number of exceptions be most reduced.

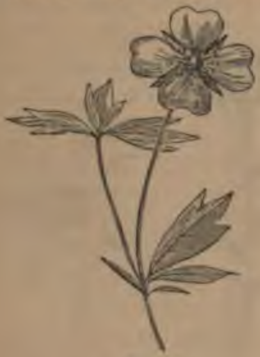

Fig. 120.
Tormentil.

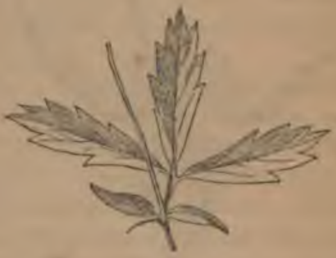

Fig. 121.
Leaf of Tormentil, showing the stipules.

In Britain, there grow wild or have become naturalised about thirty admitted "species," and a considerable number of forms of rose and bramble concerning which opinions are divided. Certain representatives of these two thorny genera would appear to be extremely prone to sport into "varieties," and possibly they may produce hybrids. No one can pronounce positively what they are; but the weight of evidence and belief is in favour of their being "varieties." Reckoning them as "species," the number of British Rosaceæ would be about ninety. Three species of *Potentil'la*, formerly included in the lists of our native plants, are now considered to have no genuine claim. These are *Potentil'la al'ba*, (E. B. xx. 1384.) *Potentil'la opa'ca*, (xxxv. 2449.) and *Potentil'la tridenta'ta*. (xxxiv. 2389.) *Ru'bus arc'ticus*, (E. B. xxiii. 1585.) *Ro'sa cinnamo'mea*, (xxxiv. 2388.) and *Ro'sa Dickso'ni* (Supp. ii. 2707.) must also be excluded.

A.

STEMS AND PETIOLES DESTITUTE OF PRICKLES.

* *Flowers yellow; the colour usually bright and decided.*

A bushy shrub, 2—4 feet high. Leaves *quasi*-pinnate, about an inch long, and hairy. Flowers large, somewhat clustered at the ends of the branches; petals five. 14. SHRUBBY POTENTILLA.

Herbaceous plants; or if woody at the base, only a few inches high.

1. Lower leaves lyrate or interruptedly-pinnatifid; very much longer than broad. Petals five.

Leaves white and very silky, especially underneath, the leaflets deeply serrate. Stems wire-like, more or less prostrate and trailing. Flowers axillary and solitary. 16. SILVERWEED.

Leaves not silky. Stems decidedly erect, 1—2 feet high.

Flowers in erect and slender spikes 6—12 inches long. Calyx 5-cleft, with numerous hooked bristles at the upper part, that become more conspicuous after flowering. Petals five, fugitive. Stamens 5—8—15. Ovaries 1—3, enclosed in the calyx. Leaves irregularly pinnatifid. 24. AGRIMONY.

Flowers terminal, solitary, on long peduncles, small and erect, and less conspicuous than the round reddish-green heads of hooked achenia which succeed them. Lower leaves lyrate; upper ones ternate. Stipules large, rounded and cut. 27. YELLOW AVENS.

2. Leaves all quinate, *quasi*-digitate, or ternate, not or very little longer than broad: achenia small and dry, and without tails.

Stamens and pistils less than ten, usually five. Stems trailing, 1—5 inches long. Leaves ternate, the lobes wedge-shaped and ending in three points. Petals linear, shorter than the calyx. 23. SIBBALDIA.

Stamens 15—20 or more.

Leaflets obovate, *white and downy underneath.* Flowers small, several together at the ends of the prostrate branches. 18. HOARY CINQUEFOIL.

Leaves green on both surfaces.

Stems prostrate, *rooting at the joints.* Leaflets five, obovate, tapering at the base, and serrated. Flowers usually pentamerous, handsome, solitary, and on long peduncles. 19. COMMON YELLOW CINQUEFOIL.

Stems not rooting.

Flowers mostly pentamerous, 2—3 together. Stems prostrate, 3—6 inches long. Leaflets obovate, serrate at the end; upper ones mostly in fives. 15. EARLY YELLOW CINQUEFOIL.

Flowers mostly tetramerous. (Fig. 120.)

All the leaves on long stalks. Stems sparingly branched. 21. LARGE TORMENTIL.

Upper leaves sessile. Stems repeatedly forked, bushy, and somewhat erect at the upper part. 22. COMMON TORMENTIL.

(STEMS AND PETIOLES DESTITUTE OF PRICKLES.)

** *Flowers not yellow. Leaves ternate, pinnatifid, lyrate, or otherwise divided.*

1. Flowers red or purple, clustered a few together.

Lower leaves interruptedly-pinnate and somewhat lyrate. Stem-leaves ternate. Flowers drooping. Calyx deeply tinged with purple; petals tawny-red, with darker veins. Achenia with hairy tails. 26. RED AVENS.

Lower leaves *quasi*-pinnate, with 5—7 oblong, deeply-serrated leaflets; upper ones with 3—5 leaflets. Stems reddish, 12—18 inches high, prostrate and creeping at the base. Flowers deep reddish-purple. Petals much smaller than the sepals. Anthers large and crescent-shaped. Fruit strawberry-like. Achenia without tails. Foliage glaucous. Plant half-aquatic. 13. WATER SEPTFOIL.

2. Flowers white, greenish-white, ivory or cream-coloured.

a. Flowers in panicles; stems erect, 1—2—3 feet high, ovaries few, greenish, and becoming little follicles.

Leaves lyrate and interruptedly-pinnatifid, the terminal lobe large; white underneath. Stem 2—4 feet high, branched above. Panicles large and loose, the middle branch sessile. Flowers ivory-colour, with no red in them, and *very fragrant.* 29. MEADOW-SWEET.

Leaves interruptedly and doubly-pinnatifid, all the lobes deeply cut and serrated. Flowers *scentless,* in rather thin panicles, the petals externally pink before expansion. 30. DROPWORT.

b. Flowers few and corymbose, or solitary. Petals five.

Calyx 5-lobed. Petals greenish-white; drupeolæ few and juicy; leaves more or less lobed or *ternate.*

Flowers unisexual, solitary, and terminal. Leaves 5—7—9-lobed, the lobes short and obtuse. Stems creeping underground. Flowering-branches 4—12 inches high. 11. CLOUDBERRY.

Flowers bisexual, in small corymbs. Leaflets three, ovate-elliptical, tapering at each extremity. Runners long and prostrate. 10. LITTLE ROCK BRAMBLE.

Calyx 10-lobed. Petals pure white. Leaves *ternate.*

Plant with long runners, which take root at intervals. Petals entire, their margins in contact, and the corolla circular. Peduncles erect, 3—6 inches high. Fruit red and pulpy. 12. WILD STRAWBERRY.

No runners. Fruit a head of small and dry achenia; the petals notched, their margins far apart, and the corolla starlike. Peduncles generally very short. 20. LITTLE MOCK-STRAWBERRY.

Calyx 10-lobed. Petals large and pure white. Leaves *quasi*-pinnate and lyrate, with 5—7—3 serrate lobes. Stem erect, 12—18 inches high, branched, and many-flowered. No runners. 17. STRAWBERRY-FLOWERED CINQUEFOIL.

(STEMS AND PETIOLES DESTITUTE OF PRICKLES.)

⁂ *Flowers not yellow. Leaves simple; serrated, but not divided.*

1. Shrub, 2—4 feet high. Leaves elliptic-lanceolate, serrated, and glabrous. Flowers rose-coloured, in terminal, compound, and crowded racemes or dense panicles. 28. WILLOW-LEAVED SPIRÆA.
2. Leaves oblong, serrated, white with woolly down on the under surface. Lobes of the calyx eight, *all in one row*. Petals eight, large and *white*. Styles ultimately becoming feathery tails. Stems procumbent, 3—6 inches long. 25. MOUNTAIN DRYAS.
3. Leaves roundish or kidney-shaped, often 5, 7, or 9-lobed; flowers solitary, terminal, and unisexual; calyx 5-cleft; petals five, greenish-white.—Drupeolæ few, juicy, and orange-red. Stems 4—12 inches high. 11. CLOUDBERRY.

B.

STEMS AND PETIOLES MORE OR LESS PRICKLY.

*

Sepals distinct and separate from the base, usually flat and spreading; the whole of the calyx permanent and usually leafy. Ovaries, with their styles and stigmas, forming a conspicuous and tufted mound in the centre, and becoming a conical mass of drupeolæ. (*Brambles.*)

Flowering-stems herbaceous, erect, 8—15 inches high, with a few creeping runners from the base. Leaflets usually three, ovate elliptical, tapering at each extremity. Stipules ovate-oblong or lanceolate. Flowers in small corymbs. Petals greenish-white. Drupeolæ very few, large and red. 10. LITTLE ROCK BRAMBLE.

Flowering-stems woody, 2—6—8 feet long. Stipules subulate or linear.

Stems erect, or nearly so, glaucous, 2—5 feet high. Leaves pinnate, with 5—3 serrated leaflets, white underneath; flowers drooping; petals not longer than the calyx; fruit crimson or yellowish. 7. WILD RASPBERRY.

Stems more or less arched or trailing; sometimes nearly erect: leaves ternate, trifoliolate, or irregularly quinate.

Stems cylindrical, glandular, hairy. Peduncles 1—3-flowered. Fruit consisting of about five large and glaucous drupeolæ *clasped by the erect calyx*. 9. DEWBERRY.

Stems angular, more or less prickly, trailing on the ground, or ascending, and then 6–8 feet high. Leaves variously lobed, ternate or quinate; either glabrous and green upon both surfaces, or downy upon the under side, often with a deep purple tinge, and in autumn usually changing to crimson. Flowers in panicles, the petals whitish or pink, and much crumpled. Fruit consisting of numerous, glabrous, and shining drupeolæ, red while young, usually jet-black when ripe; the persistent *calyx spreading or reflexed*. 8. COMMON BLACKBERRY.

(STEMS AND PETIOLES MORE OR LESS PRICKLY.)

**

Calyx urn-shaped, contracted at the orifice; the lower portion enclosing the numerous ovaries (which are hard and hairy) and becoming a red or black and succulent "hip" as they ripen. Upper portion spreading into five green and leafy lobes. Stems shrubby. Leaves pinnate. (*Roses.*)

1. Leaves aromatic, doubly-serrate. Plant erect, 4—6 feet high, the branches numerous, stout and glabrous, but prickly. Petals bright pink. Fruit scarlet, usually without bristles. Flowers rather small, generally three together, sometimes solitary. 5. SWEET-BRIER.

2. Leaves without aromatic scent.

a. Styles united into a long smooth column, which projects a long way beyond the neck of the calyx. Flowers mostly white. Fruit usually without bristles, and not retaining the calyx-lobes.

Shoots long, trailing and cord-like, and of a dull glaucous green, generally tinged with purple; the prickles solitary, scattered, feeble, and often nearly straight. Flowers cup-shaped while young. Fruit globular and dark red. 2. TRAILING FIELD ROSE.

Shoots stout and assurgent, and of a bright green colour. Prickles all stout and hooked. Flowers always much expanded. Fruit ovate-oblong and scarlet. 3. TALL WHITE HEDGE ROSE.

b. Styles included, or nearly so, in the tube of the calyx, a mound of stigmas alone visible in the centre of the flower.

Calyx and hips rough with bristles. Prickles of the stem straight or nearly so. No bristles upon the shoots, which are long and stout. Leaves doubly-serrated and somewhat downy. Lobes of the calyx pinnatifid and cut. Flowers mostly deep pink. Fruit crowned with the copiously-feathered and permanent calyx-lobes. 4. BRISTLY-FRUITED DOG-ROSE.

Calyx and hips without bristles. Leaves glabrous or occasionally downy.

Plant (in the wild state) seldom more than a yard high, and generally much less; bushy and compact. Leaflets small, in 7—9 pairs, and simply serrated. Prickles very numerous, sharp, and nearly straight. Bristles abundant upon the shoots. Flowers cream-coloured or yellowish, fragrant, and solitary at the ends of the short branches. *Fruit nearly globular*, usually *dark-purple or black*, and crowned by the permanent calyx-lobes. 6. BURNET ROSE.

Plant 5—8 feet high, with long, trailing, and spreading branches. Prickles stout, hooked, and strongly deflexed. Flowers usually pink, fragrant, and nearly solitary. *Fruit urn-shaped or ovoid*, and *bright scarlet* when ripe; the calyx-lobes previously falling away from it. 1. COMMON DOG-ROSE.

HABITATS AND DISTRIBUTION.

1. COMMON DOG-ROSE—*Ro'sa cani'na.*

Hedges and thickets; everywhere. Fl. June, July.

Curtis, ii. 326; E. B. xiv. 992.

In summer tossing out wreaths of pink and green, and making elastic flowery arches, there is probably no blossom of the hedgerows, unless the sweet-breathed honeysuckle, that gives more pleasure to the lover of simple nature. "The last rose" may have its pathos; the first is like the smile of a child; and when the lean and denuded twigs hold up those beautiful clusters of scarlet berries, shaped like urns, that foretel the coming of winter, it is far less like decay than resurrection.

There is very commonly seen upon the branches, and sometimes upon the leaf-stalks, a pretty little green tuft resembling moss, which, as the season advances, turns crimson. The heart of it is solid, and serves as a nest for a number of minute grubs, the eggs from which they proceeded having been deposited in the bark by an insect-magician called *Cynips*. The sap exudes where the eggs are placed, and by the time they are hatched, this green thicket is ready to shelter them. By mid-winter the mossy character is gone; a brown lump alone remains, with apertures in it by which the creatures have made their exit.

The principal forms of the *Ro'sa cani'na*, which, like several other species, runs into many varieties, are named and characterised as follows:—

Ro'sa cani'na—α. Leaflets glabrous and carinate; the serratures simple. E. B. xiv. 992.

———— β. *sarmenta'cea.* Leaflets glabrous and carinate; the serratures compound. Curtis, ii. 326; E. B. Supp. i. 2595.

———— γ. *surculo'sa.* Leaflets glabrous and flat; the serratures simple.

———— δ. *dumeto'rum.* Leaflets more or less hairy, and flat. E. B. Supp. i. 2610.

———— ε. *Forste'ri.* Leaflets more or less hairy; not flat. E. B. Supp. i. 2611.

Besides these, it is probable that the *Ro'sa cani'na* includes the forms called *Ro'sa cæ'sia*, (E. B. xxxiii. 2367.) and *Ro'sa Borre'ri* or *dumeto'rum*, (E. B. xxxvi. 2579.) which last is the "scentless sweetbriar," or *Ro'sa rubigino'sa* var. *inodo'ra* of Curtis (iii. 498.)

2. TRAILING FIELD ROSE—*Ro'sa arven'sis.*

Hedges, thickets, and upon the dry and waste borders of fields and lanes, where there is ample margin; common. In Scotland rather scarce. Fl. June—August.

Curtis, iii. 495; E. B. iii. 188; Baxter, v. 325.

Distinguished from every other British rose by its slender and trailing stems, which are prone to form low mounds and rough bushes, shaped like haycocks. The bloom is soft and creamy; not pink, but with a yellowish tinge, and totally different from that of the common dog-rose or *R. cani'na*, which it also considerably outlasts. In autumn it is distinguishable by its clusters of small and nearly globular hips, not scarlet and polished, like those of the *cani'na*, but dull red, like the fruit of the hawthorn. The hairy-fruited variety is very rare.

3. TALL WHITE HEDGE ROSE—*Ro'sa sys'tyla.*

Hedges and thickets; rather uncommon, and chiefly in the south. Fl. June, July.

E. B. xxvii. 1895 (as *Ro'sa colli'na.*)

The height of this showy plant, which is often 10—12 feet, and the large and usually clear white flowers, often serve to indicate it at a long distance. Yet the characters which differentiate it from the *arven'sis* seem in many cases not reliable, and possibly it may be only a luxuriant form of that not very sportive species.

4. BRISTLY-FRUITED DOG-ROSE—*Ro'sa villo'sa.*

Hedges and thickets; chiefly in the north of England, in Scotland, and in Ireland. Fl. July.

E. B. xxxv. 2459 (as *Ro'sa mol'lis.*)

To this variable species may probably be referred all the following:—

Ro'sa tomento'sa.—Curtis, iii. 496; E. B. xiv. 990.
—— *scabrius'cula.*—E. B. xxvii. 1896.
—— *Hiber'nica.*—E. B. xxxi. 2196. Ireland only.
—— *Sabi'ni.*—E. B. Supp. i. 2594.
—— *Donia'na.*—E. B. Supp. i. 2601 (the flower only.)
—— *gra'cilis.*—E. B. ix. 583 (as *Ro'sa villo'sa;* the figure of the flower only.)
—— *pomif'era.*—Not indigenous to Britain, but well known in gardens and upon the continent, as the "Apple-rose."

5. SWEET-BRIER—*Ro'sa rubigino'sa.*

Hedges and thickets; chiefly in the south and east. Fl. June, July.

Curtis, iii. 497; E. B, xiv. 991.

Universal in gardens, and familiar to everyone in the deliciously aromatic odour of the leaves, which emanates from the small glands upon the edges and under surface. These glands, like all others, form a beautiful object for the microscope. "Eglantine" is the same thing.

Ro'sa micran'tha (E. B. xxxv. 2490.) and *Ro'sa se'pium* (E. B. Supp. i. 2653.) do not appear specifically distinct.

6. BURNET ROSE—*Ro'sa pimpinellifo'lia.*

Dry and sandy places near the sea; common. Sometimes in similar habitats inland. Isle of Arran, very fine. Fl. summer.

E. B. iii. 187 (as *Ro'sa spinosis'sima.*)

A very pleasing little plant, and the rival of the Eryngo in claims to be the *noli-me-tangere* of the sandhills, which its soft-hued flowers contribute greatly to enliven. A variety with concave and incurved petals, found in the Hebrides, is by some called *Ro'sa involu'ta.* (E. B. xxix. 2068.) Another variety, with scarlet fruit, is sometimes called *Ro'sa rubel'la.* The flower of this last is represented in E. B. xxxvi. 2521, and the fruit in E. B. Supp. i. 2601, in connection with the flower of *R. Donia'na,* above cited. *Ro'sa Wilso'ni* (E. B. Supp. ii. 2723.) is a variety with the leaflets hairy on both surfaces, said to grow in the neighbourhood of the Menai Bridge. Some authors refer it to *Ro'sa villo'sa.*

7. WILD RASPBERRY—*Ru'bus Idæ'us.*

Woods, thickets, and rough-edged lanes; also on the borders of moors, and in bushy uncultivated places; generally distributed, though in some districts rare. Extremely common near Manchester. Near Bristol scarcely known. Fl. June. Fruit ripe in August.

E. B. xxxiv. 2442.

The raspberry is the only fruit which is as well-tasted in the wild state as under culture. All the fine varieties grown in gardens, both red and yellow, are derived from the indigenous British species.

8. COMMON BLACKBERRY—*Ru'bus frutico'sus.*

Hedges, thickets, woods, and waste places; everywhere, except in the Scotch Highlands, where it ceases to be, as in England, a predominating feature in the vegetation. Fl. May—September. Fruit ripe in September, and lasting, in succession, till November.

E. B. x. 715, &c., as below; Baxter, v. 334.

The common bramble is the most variable plant of the British Flora. Under one form or another, there is no terrestrial habitat it does not occupy. In hedges it grows to the height of 8—9 feet, and in due time puts forth great panicles of jetty and many-beaded fruit that falls to the touch of the finger; in woods, upon heaths, and upon the sandhills by the sea, it trails along the ground, and the scanty fruit often consists of no more than a solitary bag of juice, which is unusually large. The leaves exhibit every gradation of change from the simple and ovate, through the trifoliolate, up to the digitate, (Fig. 116.) the figure and surface of the leaflets keeping equal pace, and often presenting a considerable variety upon a single branch. The surface of the stem and branches is similarly varied, some kinds being nearly or quite glabrous, others hairy or downy, and covered more or less plentifully with prickles. Such diversities cannot fail to suggest the idea of numerous species, but no characters have yet been discovered by which more than a very few of the forms can be distinguished year by year, and none whatever by which they can be tabulated on paper. Botanists who consider that many species do really exist, run up the number, in some cases, to no less than forty, and describe a score of "sub-species" in addition. The forms figured in E. B. are:—*Ru'bus corylifo'lius,* (xii. 827.) *Ru'bus suberec'tus,* (xxxvi. 2572.) *Ru'bus rhamnifo'lius,* (Supp. i. 2604.) *Ru'bus Köhle'ri,* (Supp. i. 2605.) *Ru'bus macrophyl'lus,* (Supp. i. 2625.) *Ru'bus leucosta'chys,* (Supp. i. 2631.) *Ru'bus carpinifo'lius,* (Supp. i. 2664.) *Ru'bus plica'tus,* (Supp. i. 2714.) and *Ru'bus glandulo'sus.* (Supp. iv. 2883.) For the asserted characters and inextricable synonymy, see Babington's "Manual," or Irvine's "Illustrated Handbook of British Plants."

9. DEWBERRY—*Ru'bus cæ'sius.*

Hedges and thickets; common. Fl. June, July.

E. B. xii. 826.

Immediately distinguished by the fruit, which consists of a very few large and deeply glaucous drupeolæ, half-concealed by the erect calyx. Yet it is by no means certain that even this is really different from the *frutico'sus.* There are good grounds for believing that the only true species of British *Rubi,* (always excepting the cloudberry and the *saxat'ilis*) are the wild raspberry and the "blackberry," as known to children and the non-botanical.

10. LITTLE ROCK BRAMBLE—*Ru'bus saxat'ilis.*

Dry woods and stony cloughs; common in the north of England, the north of Ireland, North Wales, and Scotland. In profusion in the forest of Darnaway, Morayshire. Fl. June.

Curtis, iv. 617; E. B. xxxii. 2233.

11. CLOUD-BERRY—*Ru'bus Chamæmo'rus.*

Elevated moorlands, 500 to 3,000 feet above the level of the sea; common. Fl. June; ripening its large and showy berries towards August.

Curtis, iii. 494; E. B. viii. 716.

Like the hautboy strawberry, this plant has unisexual flowers, and is apparently diœcious; but the stems which bear the male and female flowers respectively, seem to be united underground, making it in reality monœcious.

12. WILD STRAWBERRY—*Fraga'ria ves'ca.*

Hedgebanks, upon weedy and turf-topped walls, and in the dry parts of woods; abundant everywhere. Fl. May—July.

E. B. xxii. 1524; Baxter, iv. 242.

Warmed and scented by the sun of a fine summer, this little rural fruit is by no means to be despised.

The garden strawberry is the *Fraga'ria ela'tior* (E. B. xxxi. 2197.) Whether distinct as a species from the *ves'ca* is very doubtful, no differential characters being discoverable in it beyond the greater size, the fewer runners, and a strong disposition to produce unisexual flowers. It is said to be occasionally found wild or naturalised in woods.

13. WATER SEPTFOIL—*Coma'rum palus'tre.*

On the plashy borders of ponds, and not merely fringing their edges, like mints and willow-herbs, but extending to where the water is ten or fifteen inches deep; common, but chiefly in the north. Very abundant near Manchester. Fl. June, July.

E. B. iii. 172; Baxter, iii. 197.

A very curious and interesting plant. The interior of the sepals, like the petals, is of a dark purplish red; the leaves are glaucous, and formed of 3—5—7 large serrated leaflets; and the fruit resembles a juiceless strawberry.

14. SHRUBBY POTENTILLA—*Potentil'la fruitico'sa.*

Dry bushy places upon hills; very rare. Teesdale, near the waterfall called the High Force. Ireland, in Clare and Galway counties. Fl. June, July.

E. B. ii. 88.

Common in gardens.

15. EARLY YELLOW CINQUEFOIL—*Potentil'la ver'na.*

Dry upland pastures, and rocky waste ground; rather rare. Fl. May, June.

E. B. i. 37.

The *Potentil'la au'rea* of E. B. viii. 561, the "Orange Alpine Cinquefoil," is a large and luxuriant variety, with deep-coloured flowers, found chiefly upon the Breadalbane mountains.

16. SILVERWEED—*Potentil'la Anseri'na.*

Roadsides; in poor, dry, waste ground; in black thoroughfares near great towns; among the surviving grass of cindered paths, and even upon cinder-heaps; occasionally upon moist hedgebanks, and then luxuriant and greener: common everywhere. Fl. May—August.

Curtis, i. 176; E. B. xii. 861.

One of the most charming of our native plants, whether in the silvery feathers of its foliage or in the bright golden lustre of its blossoms, which lie close upon the ground, unless the plant be drawn up by taller ones. (Fig. 115.)

17. STRAWBERRY-FLOWERED CINQUEFOIL—*Potentil'la rupes'tris.*

Shady rocks upon the north and west sides of Craig Breiddin, Montgomeryshire; principally in the middle zone. Fl. June, July.

E. B. xxix. 2058; Baxter, iv. 313.

18. HOARY CINQUEFOIL—*Potentil'la argen'tea.*

Dry pastures upon gravelly soil; not common. Fl. June, July.

E. B. ii. 89.

19. COMMON YELLOW CINQUEFOIL—*Potentil'la rep'tans.*

Hedgebanks and waysides; very common. Fl. June—August.

Curtis, i. 37; E. B. xii. 862 (but rarely so much creeping as there represented.)

The leaves resemble those of the horse-chesnut tree in miniature, and the flowers are occasionally tetramerous.

20. LITTLE MOCK-STRAWBERRY—*Potentil'la Fragarias'trum.*

Everywhere on dry hedgebanks, the earliest of the thin-strewn blossoms of spring; in open seasons and sheltered spots beginning to bloom in December, and from February to May forming pretty constellations with its white corollas.

Curtis, i. 175; E. B. xxv. 1785 (both as *Fraga'ria steri'lis.*)

This little plant is very commonly mistaken for the wild strawberry. But the strawberry seldom blossoms before May, when the *Potentil'la* has well-nigh finished, and has flowers twice or thrice as large, and lifted, three or four together on stalks as many inches high; whereas those of the *Potentil'la* crouch among the leaves, or at least while young, and if not drawn up by surrounding plants of greater stature. Moreover, in the *Potentil'la* the sepals are visible in the spaces between the narrow petals, which very soon drop off, while in the strawberry there is a full and continuous whiteness, concealing the sepals, and the corolla is comparatively enduring.

21. LARGE TORMENTIL—*Tormentil'la rep'tans.*

Hedgebanks and in woods; common. Fl. May—September.

E. B. xii. 864 (but rarely so upright or decidedly panicled.)

By many deemed a variety of the next. Whether really distinct or not, the name *reptans* is inappropriate, since the branches do not "creep," but simply lie prostrate on the soil, extending often to the length of 25 inches.

22. COMMON TORMENTIL—*Tormentil'la officina'lis.*

Moors, heaths, on banks, and in dry woods; common everywhere. Fl. May—August, and often putting forth a reminiscence of summer when every leaf is off the trees.

Curtis, ii. 327; E. B. xii. 863; Baxter, v. 341.

A cheerful, unpretending little plant, known immediately by its cross-shaped golden blossoms, borne singly, instead of in clusters, as in all other yellow cross-shaped flowers, (the large Tormentil excepted) and by its long and thread-like stems, which are generally entangled among other little herbs, and crowded with ternate or five-lobed leaves.

23. SIBBALDIA—*Sibbal'dia procum'bens.*

Mountain-sides in the Scotch Highlands; ascending to the height of 4,000 feet above the level of the sea; common. Abundant on the north side of Ben Lomond. Fl. July.

E. B. xiii. 897; Baxter, vi. 470.

24. AGRIMONY—*Agrimo'nia Eupato'ria.*

Rough pastures, waste and bushy places, and on the borders of dry fields; common. Often caught straying from them on to the grassy borders of roadsides and into lanes. Fl. July, August.

Curtis, ii. 324; E. B. xix. 1335; Baxter, ii. 88.

An elegant and interesting plant, the flowers of its solitary golden spike smelling like apricots, and succeeded in due time by innumerable little burrs.

25. MOUNTAIN DRYAS—*Dry'as octopet'ala.*

Stony alpine heaths, and upon the slopes of lofty mountains, chiefly in micaceous or calcareous soil; rare. Common on some of the mountains of Scotland and Ireland. Fl. June, July.

E. B. vii. 451; Baxter, iv. 248.

This charming alpine is universally acknowledged to be one of the most elegant plants of the mountain Flora of northern latitudes. The foliage being evergreen, adds greatly to its beauty. The snow-white flowers, which are nearly an inch across, sometimes have their calyx-lobes and petals increased from eight to ten. The long hairy tails of the achenia resemble these of the anemone or clematis, being destitute of joints, wavy, and much attenuated. *Dry'as depres'sa* differs only in name.

26. RED AVENS—*Ge'um riva'le.*

Moist places in woods and thickets, particularly in the little niches and side-chapels in glens and cloughs, where water trickles, and on the banks of rivers where shaded by trees; tolerably common, especially in the north of England, Wales, and Scotland. Fl. May, June.

E. B. ii. 106; Baxter, i. 3.

Common in gardens, where it is sometimes seen with the flowers double.

27. YELLOW AVENS—*Ge'um urba'num.*

In woods, and upon dry, shady hedgebanks, especially by waysides; very common. Fl. May—July.

Curtis, i. 109; E. B. xx. 1400.

A plant called *Ge'um interme'dium*, often found in gardens, appears to combine the characters of this and the preceding species.

The peculiar feature of the Geums is the conversion of the head of fruit into a cluster of little hooks, the handles of which consist of the ovaries. The hook originates in a joint about half-way up the style, which part is permanent, and elongates considerably as the ovaries approach maturity, eventually twisting itself at the joint in such a manner as to give the extremity of the lower portion the form of a sickle. In some species, as the *riva'le*, the portion above the joint becomes feathered with fine hairs, forming a tail which bends away at a right angle; in others, as the *urba'num*, it remains glabrous or nearly so, and the hook is the most conspicuous part.

28. WILLOW-LEAVED SPIRÆA—*Spiræ'a salicifo'lia.*

Thickets and hedges, occasionally, in the north of England, Wales, and Scotland, but almost certainly an introduced plant, being very common in gardens and shrubberies. Ferry-woods, opposite Bowness, abundant. Fl. July, August.

E. B. xxi. 1468.

29. MEADOW-SWEET—*Spiræ'a Ulma'ria.*

Moist ditchbanks and borders of ponds, among willow-herbs and rushes, and in damp woods and cloughs, where water settles; common everywhere. Fl. July, August.

Curtis, ii. 325; E. B. xiv. 960.

A plant universally pleasing, from its light and elegant form, and the delicious hawthorn-like scent of its ivory blossoms, which always come out in great plenty. The panicles are conspicuous at a long distance, and tell where the water-courses lie concealed among the grass. Many call it "Queen-of-the-meadows." The flowers, dried and powdered, make an effectual styptic for slight cuts, such as a razor gives. Varieties occur in gardens with variegated leaves and with double corollas.

30. DROP-WORT—*Spiræ'a Filipen'dula.*

Dry fields, heaths, and downs, upon chalk and limestone; not uncommon. Ormeshead. Bredon Hill, Worcestershire, abundant. Fl. June, July.

Curtis, iii. 493; E. B. iv. 284; Baxter, ii. 133.

The roots consist of numerous oval knobs or tubers, held together by slender fibres. Externally they are black, but internally white and farinaceous. The petals of this species, even in the wild state, are often *six*, and in gardens, where it is common, the flowers are usually double.

The especial contribution of the Rosaceæ to garden ornament needs no introduction. The Rose, in its odour and loveliness, has in every age been the acknowledged queen of flowers, the metaphor of perfection, another name only for whatever in nature is most delightful of its kind, and to-day glows richer than ever in its grand old hereditary beauty. Many species are in cultivation, but the thousands of "sorts" with fancy names, are referable to scarcely more than half a dozen of them. The best-marked are the old-fashioned double-red or "cabbage-rose," the *Ro'sa centifo'lia*—that fine full-breasted, deep-hearted flower, of which the moss-rose, "dear to sketching maidens," is a variety; the monthly-rose, usually trained against walls; the little Banksian rose, with clusters of yellowish flowers like carnations; the damask-rose or *Ro'sa Damasce'na*, from which the celebrated "York and Lancaster" has been derived; the *Ro'sa Gal'lica*, represented in many of the very dark-hued kinds; the old white or *Ro'sa al'ba*, a native of the Crimea; the yellow rose or *Ro'sa lu'tea*, and the China rose or *Ro'sa In'dica.* "Provence roses" are derivations from the *Ro'sa centifo'lia;* musk-roses are the *Ro'sa moscha'ta*, from Barbary. In addition to the varieties obtained from these exotic species, a great many have been raised from the seeds of the indigenous *Ro'sa pimpinellifo'lia*, and are generally known as Scotch or Ayrshire roses. Roses that have *green hearts* are not special varieties, but casualties, more interesting and valuable to the physiologist than to the florist, especially when a second rose is thrown up from the centre, as sometimes happens. The most curious of all garden roses is that in which the sepals of the calyx become crested and fringed, like "parsley-ferns." Bot. Mag. lxiii. 3475 represents such a variety of the *centifo'lia.*

Next in interest to this beautiful genus come the various species of *Spiræ'a*, some shrubby, with close panicles of small pink blossoms; others herbaceous, with flowers resembling those of the meadow-sweet, such as the *Spiræ'a Arun'cus.* "Italian May" is the *Spiræ'a hypericifo'lia*, a very free-flowering species, with abundance of light-green cuneate leaves. *Spiræ'a bel'la* (Bot. Mag. l. 2426.) is a beautiful shrub from Nepal, with ovate, sharply serrated leaves, whitish underneath, and corymbs of rose-coloured bloom. *Spiræ'a tomento'sa* resembles the common *salicifo'lia* in its flowers, but the under surface of the leaves is covered with reddish-brown pubescence. *Spiræ'a triloba'ta* has pretty little roundish yet lobate leaves, and numerous compact corymbs of pure white flowers. *Spiræ'a opulifo'lia* attains the stature of a small tree, and bears hemispherical corymbs of white flowers, followed by abundance of inflated and reddish follicles. *Spiræ'a ariæfo'lia* is remarkable for its extreme fecundity in panicles. *Spiræ'a sorbifo'lia* and *Lindleya'na* have noble pinnate leaves, and fine thyrse-like clusters of bloom that give them perhaps the first place among the shrubby species.

Ornamental species of *Ru'bus* occur now and then, especially the *Ru'bus spectab'ilis*, with blossoms of a fine red, and the *Ru'bus odora'tus*, (Bot. Mag. ix. 323.) the flowers of which are fragrant. *Low'ea berberifo'lia* is a rare and very curious shrub, with rose-like yellow flowers, purple in the centre, like the gum-cistus, and simple and exstipulate leaves. Against walls is very commonly seen a slender twiggy shrub, with ovate, serrate, finely acuminate leaves, and copious orange-coloured blossoms, universally double, (though the single state has been introduced) and which turn white in decay. This is the *Ker'ria Japon'ica*, invaluable from opening its flowers as early as March.

The best herbaceous exotics representative of the family, are the *Potentil'las*, with flowers like those of the strawberry, white, red, puce-coloured, or yellow, and ternate, quinate, or lyrate leaves. *Potentil'la Nepalen'sis* has strawberry-like leaves, and flowers the colour of port-wine. *Potentil'la opa'ca*, equally common, and with yellow flowers, is remarkable for its digitate foliage. Several handsome species of *Ge'um* also occur, resembling the native *riva'le*, improved; along with the *Siever'sia monta'na*, a plant under a foot high, with large, lyrate, interruptedly-pinnate leaves, and yellow corollas resembling those of the marsh-marigold, followed by achenia with hairy tails like those of the pasque-flower. *Dalibar'da Fragarioi'des* (Bot. Mag. xxxviii. 1567.) has strawberry-like leaves, deeply indented, and yellow flowers. *Gille'nia trifolia'ta* (Bot. Mag. xiv. 489.) is esteemed for its neat foliage and pure white petals.

LXXIII. THE SAXIFRAGE FAMILY.—*Saxifraga'ceæ.*

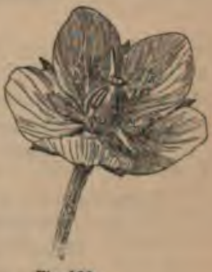
Fig. 122.
Flower of Parnassia.

Herbaceous plants, mostly of neat and pretty aspect, and often growing in dense and moss-like patches. Leaves simple, either inclining to ovate or roundish, and then usually serrate or crenate, or irregularly pinnatifid; always without stipules, and in most cases alternate. Flower-stems 2—12—18 inches high, generally a little glandular and viscid or hairy, especially at the upper part, and usually terminating in light panicles or corymbose clusters. In a few instances the blossom is solitary. Flowers almost always pentamerous, and usually with ten stamens. Calyx often partially united to the ovary, and sometimes lifted almost to the summit, so as to render the flower apparently epigynous. Corolla regular, except in one or two instances; the petals attached, along with the stamens, to the calyx. Ovary usually of two carpels, which cohere below, but diverge at the upper part, or at least as they approach ripeness. Stigmas sessile. Fruit capsular. Seeds numerous and minute. No species of this family are fragrant; the colours of their flowers are white, pink, red or yellow, often broken with little spots of darker hue. In the genus *Chrysosple'nium* the petals are absent, and the calyx is usually four-cleft, with eight stamens.

The Saxifragaceæ belong entirely to the temperate parts of the northern hemisphere, abounding upon mountains, and "frequently forming the chief beauty of that rich turf which is found near the snow in high alpine stations." A few grow in moist meadows and woods; some even upon walls and dry rocks. They are noted for their astringency, and a few are bitter and tonic.

Between three and four hundred species are known, sixteen growing wild in Britain, and some of them with many varieties. *Saxif'raga pedatif'ida* (E. B. xxxii. 2278.) and *Saxif'raga moscha'ta* (E. B. xxxiii. 2314.) are not now accounted native.

A.

FLOWERS MOSTLY TETRAMEROUS, AND CONSISTING OF CALYX ONLY.

Stems 4—5 inches high, terminating in clusters of minute yellow or greenish-yellow blossoms, the clusters flat and horizontal, and 1—3 inches in breadth. Leaves roundish and crenate, the lower ones on long stalks. Whole plant very tender and succulent. Stamens eight. [Some of the flowers occasionally pentamerous, with ten stamens.]

Leaves *opposite*. 15. COMMON GOLDEN-SAXIFRAGE.

Leaves *alternate*. Plant larger than the preceding, greener, and the flowers of a more decided yellow.
16. ALTERNATE-LEAVED GOLDEN-SAXIFRAGE.

B.

FLOWERS ALWAYS PENTAMEROUS, AND WITH BOTH CALYX AND COROLLA.

Stems and branches numerous, all quite *procumbent* and trailing, with large and handsome *crimson-purple flowers* at their extremities. Leaves very small, *opposite*, imbricated in four rows, and fringed along the edges.
5. EARLY PURPLE SAXIFRAGE.

Flowering-stems or branches *erect*, though the flowers may be scarcely raised above the ground. Leaves alternate or all radical.

Stamens five; ovary solitary. Flowers large, concave, pure white, the petals with semi-translucent veins. Root-leaves tufted, heart-shaped, entire, glabrous, and on petioles 3—4 inches long. Flower-stalks 3—12 inches high, each with a single roundish and sessile leaf about half-way up. Filaments of the stamens, while they are young, very short, and the large anthers pressed against the ovary, which they conceal; anthers afterwards lifted away from the ovary, through the lengthening of the filaments, and the latter eventually spreading out as five white and horizontal rays. Nectaries five, consisting of white or greenish-yellow scales, with a fringe of about thirteen erect fingers that terminate in golden-yellow or grass-green knobs. Stigmas four, sessile. Fruit an ovoid capsule. Seeds innumerable, resembling brown dust. 14. GRASS-OF-PARNASSUS.

Stamens ten; ovaries two, usually diverging, or at least as they approach maturity, and, when ripe, opening down the inner side.

* *Annual*. Plant 3—5 inches high, much-branched, viscid in every part with glandular hairs, and usually tinged with red. Leaves 3—5-cleft. Flowers minute and white. 11. RUE-LEAVED WALL SAXIFRAGE.

(Flowers always pentamerous, and with both calyx and corolla. Flower-stems erect. Stamens ten.)

** *Perennial.*

A. Flowers yellow, spotted with scarlet or deep orange. Stems more or less clothed with narrow leaves.

Calyx spreading, partially adherent to the ovary. Flowers in a loose panicle of 3—4—10—12, the sepals narrow and yellowish, and so long and large as to make the flower appear to consist of ten petals. Stems 3—6 inches high, branched at the lower part. A very gay little plant.
7. Yellow Mountain Saxifrage.

Calyx reflexed, and *quite free from the ovary*. Flowers solitary or nearly so, large and handsome, the petals twice as long as the sepals, or nearly so. Stems 6—9 inches high.
6. Yellow Marsh Saxifrage.

B. Flowers white or pinkish, often dotted with red or yellow or with both of these colours.

† Calyx quite, or very nearly free from the ovary, and the lobes *reflexed.*

Leaves thin, wedge-shaped, angular, or coarsely and acutely toothed; sometimes quite entire. Petioles very short. Panicle few-flowered. Petals white, each with two yellow spots near the base.
3. Little Star Saxifrage.

Leaves thick and leathery, and regularly crenate or serrate.

Leaves growing in rosettes, obovate or oval, the blade tapering into a broad flat petiole, and the margin with white notches. Flowers in large feathery panicles and very numerous; the petals white, dotted with yellow and pink.
2. London-pride.

Leaves circular, the blade cordate or rounded at the base, usually hairy, and often purple on the under surface. Petioles semi-cylindrical and *channelled*. Flowers in panicles; the petals cream-coloured, purplish at the base, with a central yellow stain; sometimes spotted with red.
1. Kidney-leaved Saxifrage.

†† Calyx adherent to the ovary for ½—⅔rds of its length, and the lobes erect or spreading.

a. Rhizomes with numerous brownish and downy buds.
Flowers nearly an inch across, 3—6 together, in terminal panicles; the petals white, faintly-streaked with greenish veins. Stems 6—18 inches high, slender and leafy. Lower leaves kidney-shaped, with rounded lobes, and petiolate. Upper ones sharply lobed, and sessile.
8. White Meadow Saxifrage.

(FLOWERS ALWAYS PENTAMEROUS, AND WITH BOTH CALYX AND COROLLA. Flower-stems erect. Stamens ten. *Perennials.*)

b. Little purplish bulbs in the axils of many of the upper leaves. Lower leaves angular or deeply-toothed. Flowers solitary or nearly so, white and pendulous. 9. VIVIPAROUS ALPINE SAXIFRAGE.

c. No bulbs either at the base of the stem or in the axils.

† Petals considerably longer than the calyx.

Flowers in a crowded head. Leaves all radical, obovate and sharply crenate. Stem 3—6 inches high. 4. CLUSTERED ALPINE SAXIFRAGE.

Flowers in an open panicle, pure white, large and handsome.—Herbage in dense tufts. Root-leaves 3—5-cleft; those on the prostrate flowerless shoots 3-cleft or undivided; the lobes all very narrow, *acute*, bristle-pointed, and fringed. 12. MOSSY SAXIFRAGE.

Like the preceding, but distinguished by the *obtuse* lobes of its leaves. 13. TUFTED ALPINE SAXIFRAGE.

†† Petals scarcely longer than the calyx. 10. LOCH-NA-GAR SAXIFRAGE.

HABITATS AND DISTRIBUTION.

1. KIDNEY-LEAVED SAXIFRAGE—*Saxif'raga Ge'um.*

Woods and among cliffs in the mountainous districts of Killarney, Glengariff, and Dingle, in the south-west of Ireland, in the greatest profusion. Fl. June.

E. B. xxii. 1561, and Supp. iv. 2893.

Ordinarily the leaves are somewhat hairy, but varieties occur in which they are perfectly glabrous.

The *Saxif'raga hirsu'ta* of E. B. xxxiii. 2322, found in the county of Kerry, is by some botanists considered a hybrid between the present species and the next; by others merely a variety of the *Ge'um*, to which species the *Saxif'raga el'egans* of E. B. Supp. iv. 2892 is also referable.

2. LONDON-PRIDE—*Saxif'raga umbro'sa.*

Mountainous districts in the south and west of Ireland, especially near Killarney and in Connemara, and occupying chiefly the fissures of moist rocks. Naturalised in a few places in woods in the north of England and in Scotland. Fl. May, June.

E. B. x. 663.

Universal in gardens, where it is also called "None-so-pretty" and "King's feather." E. B. Supp. iv. 2891 represents a curious variety called *serratifo'lia.*

3. LITTLE STAR SAXIFRAGE—*Saxif'raga stella'ris.*

Wet rocks and by the sides of rivulets, in the mountainous parts of the north of England, Wales, Scotland, and Ireland; the commonest of the British alpine saxifrages. Fl. June—August.

Curtis, iii. 490; E. B. iii. 167.

4. CLUSTERED ALPINE SAXIFRAGE—*Saxif'raga niva'lis.*

Damp rocky places among the mountains of North Wales, the north of England, and the Scotch Highlands; rare, especially south of the Tweed. Fl. July, August.

E. B. vii. 440.

5. EARLY PURPLE SAXIFRAGE—*Saxif'raga oppositifo'lia.*

Moist rocks upon the mountains of North Wales and the Highlands of Scotland; not rare. Snowdon. Ben Lomond. Penyghent, plentiful. Fl. April, May.

Curtis, ii. 391; E. B. i. 9.

Frequent upon garden rockeries, and cultivated in pots for its beauty as a spring conservatory-flower.

6. YELLOW MARSH SAXIFRAGE—*Saxif'raga Hir'culus.*

Wet moors; extremely rare, and perhaps extinct. North of England? Scotland? Ireland? Fl. August.

Curtis, ii. 390; E. B. xv. 1009.

7. YELLOW MOUNTAIN SAXIFRAGE—*Saxif'raga Aizoi'des.*

In damp and springy places, and on the stony borders of little rills, among the mountains of North Wales, the north of England, Scotland, and Ireland. Abundant on the terrace at Grasmere, and elsewhere in Westmoreland. Fl. July—September.

E. B. i. 39; Baxter, iii. 187.

8. WHITE MEADOW SAXIFRAGE—*Saxif'raga granula'ta.*

Damp meadows and pastures; by brooksides, especially where the soil is gravelly; in groves and copses where the ground is not crowded with vegetation; and often among the little trees on secluded river-banks; common. Fl. May, June.

Curtis, i. 30; E. B. vii. 500.

Very frequent in gardens, with the flowers double, and then immediately recognised by the clusters of small bulb-like buds at the base of the stem, covered with brownish and hairy scales.

9. VIVIPAROUS ALPINE SAXIFRAGE—*Saxif'raga cer'nua.*

Summit of Ben Lawers, abundant, growing with *Dra'ba rupes'tris* and *Ceras'tium alpi'num.* Fl. June—August.

E. B. x. 664.

10. LOCH-NA-GAR SAXIFRAGE—*Saxif'raga rivula'ris.*

Moist alpine rocks in Scotland; rare, except upon Loch-na-gar, Forfarshire, where it is plentiful. Fl. summer and autumn.

Curtis, iv. 612; E. B. xxxii. 2275.

11. RUE-LEAVED WALL SAXIFRAGE—*Saxif'raga tridactyli'tes.*

Walls and dry, barren, and rocky places; common, except in the west and north of Scotland. Fl. April, May. Annual.

Curtis, i. 101; E. B. vii. 501.

12. MOSSY SAXIFRAGE—*Saxif'raga Hypnoi'des.*

Moist and rocky places in the mountainous districts of England, Scotland, North Wales, and Ireland; common. Upon Ingleborough, in myriads. Fl. May—July.

E. B. vii. 454 (foliage not good.)

A plant with numerous varieties, several of which have been distinguished as species, viz.:—

Saxif'raga platypet'ala—More leafy than the usual state of the plant, and with larger and rounder petals. E. B. xxxii. 2276. This is the predominant form upon Ben Lawers. In gardens it is extremely common, growing in circular, moss-like cushions, ample enough for a seat, and covered with little panicles of cream-white flowers. Frequent also upon garden-rockeries.

Saxif'raga elongel'la—E. B. xxxii. 2277.
——— *hir'ta*—E. B. xxxii. 2291.
——— *affi'nis*—E. B. Supp. iv. 2903.
——— *denuda'ta.*
——— *lætevi'rens.*
——— *cæspito'sa* var. γ *incurvifo'lia*—E. B. Supp. iv. 2909. This plant is better placed here than under *cæspito'sa.*

13. TUFTED ALPINE SAXIFRAGE—*Saxif'raga cæspito'sa.*

Upon the loftiest mountains of North Wales and Ireland; rare. Fl. May, June.

E. B. xii. 794.

The *Saxif'raga palma'ta* of E. B. vii. 455, appears to be a luxuriant state of the *cæspito'sa,* with more abundant flowers. It may, however, be referable to the *S. pedatif'ida* of E. B. xxxii. 2278.

14. GRASS-OF-PARNASSUS—*Parnas'sia palus'tris.*

Wet moors, both lowland and at considerable elevations, and by waysides in their neighbourhood; common. Moist hollows among the seaside sandhills are also a favourite habitat with this charming plant. No spectacle is more beautiful about the middle and end of August than that of the little natural gardens among the sandhills at Southport, Lancashire, which are then flooded with its milk-white blossoms. Fl. late summer and autumn.

Curtis, iii. 470; E. B. ii. 82; Baxter, i. 70.

One of the loveliest of our English wild-flowers, yet not more remarkable for the beauty of its pearly cups, and its little sprays of golden-beaded nectaries, than for the phenomena that occur during the period of fertilisation. When the flower is newly opened, the stamens stand close to the ovary; their filaments are very short, and the large yellowish-white anthers almost conceal it. Subsequently the filaments elongate, one or two at a time, and place the anthers exactly above the stigmas. After a little while, or as soon as the pollen has been discharged, the filaments elongate still more; they bend away from the ovary, cast off their empty anthers, and finally stretch out horizontally, a filament lying between every couple of petals, so as to present the figure of a beautiful five-rayed star. Several days are consumed in the operation, so that it is easy to procure flowers in every stage, including overblown ones, in which the great light-purple ovary is assuming the character of capsule.

Dried between papers for the herbarium, the Parnassia preserves its brilliant whiteness unimpaired; almost every other white flower turns brown or tawny. Some authors place this genus in the St. John's-wort Family. Others class it with the sundews.

15. COMMON GOLDEN-SAXIFRAGE—*Chrysosple'nium oppositifo'lium.*

Moist ditch-banks, and by springs and runnels of water under trees and in woods; common everywhere. Fl. April, May.

Curtis, i. 100; E. B. vii. 490; Baxter, ii. 140.

One of the very early spring-flowers, unpretending and delicate, and soon catching the eye by its yellowness. When in cavernous places, shaded and with plenty of moisture, the leaves become very large, no flowers are produced, and the whole plant assumes a very odd appearance, especially towards autumn.

16. ALTERNATE-LEAVED GOLDEN-SAXIFRAGE—*Chrysosple'nium alternifo'lium.*

Moist woods, and on the edges of little streams shaded by trees; frequent, though not so common as the preceding. Fl. April, May; in warm, sheltered situations, as early as March.

E. B. i. 54.

Many plants of this family are commonly cultivated. The largest and most striking is the *Saxif'raga crassifo'lia.* The dense panicles of lilac flowers appear in March and April, scarcely raised above the level of the leaves, which are oval, shining, 4—5 inches in length and breadth, and for saxifrages enormous. By the middle or end of May they form a splendid compound raceme, 15—18 inches high, and branched in many curves, like the heliotrope. It is a great recommendation to this plant that, like the London-pride, it is indifferent to smoke and dirt, and flourishes even under the drip of grimy trees in suburban gardens. In June comes the tongue-leaved saxifrage, or *S. lingula'ta,* a noble species, easily recognised by its great pyramid of white flowers, the petals speckled with crimson, and by its hard, gray, rough-edged, tongue-like leaves, which grow in a rosette like that of the *umbro'sa.* The British species mentioned above often keep them company, together with the *Saxif'raga Pennsylva'nica,* and a host of little alpine species, grown upon rockeries and in pots, by those who love curiosities from the mountains. Various species of *Mitel'la* and *Tiarel'la,* the *Heuche'ra America'na,* and the *Parnas'sia asarifo'lia,* are also met with, but not frequently. For a parlour there is no prettier vegetable ornament than the old-fashioned

"Strawberry-saxifrage," or *Saxif'raga sarmento'sa.* Suspended in a basket, it sends out pendulous, strawberry-like stems, twenty or thirty inches long, and as fine as thread, each with a little tuft of round, hairy, concave leaves dangling at the extremity, and swaying with every movement of the air. The flowers are like those of the London-pride, but larger and irregular, two of the petals being white, pointed and pendulous, while above them are three smaller ones, erect and lilac, the general aspect of the flower being that of a little orchid.

LXXIV. THE HYDRANGEA FAMILY.—*Hydrangea'ceæ.*

The plants of this beautiful little group, along with those called the *Cunonia'ceæ*, are so intimately related to the Saxifrages, that many authors do not keep them asunder. The obvious dissimilarity is in their shrubby habit of growth, some of the Cunoniaceæ attaining the stature even of trees. In both families the leaves are invariably *opposite*, a character which in Saxifrages is exceptional and very rare; those of the Hydrangeas, as happens with Saxifrages, have no stipules; but in the Cunoniaceæ, stipules are present, and, like those of the Coffee-tree Family, they are interpetiolar. The only common species in cultivation out of doors is the well-known and truly handsome *Hydran'gea Horten'sia* or *Horten'sia Opuloi'des*, which upon lawns in genial situations forms a mound several feet high, of large elliptical leaves, with abundance of great globular corymbs of pink or blue flowers, destitute of stamens and pistils, and resembling those of the snow-ball tree or guelder-rose, only coloured. The normal condition of the corymbs is that of the *wild* guelder-rose, the flowers in the centre being pentamerous and regular, with ten stamens and 2—3 divergent ovaries, and the circle of marginal ones dilated and sterile. Near the sea, in sheltered places, as near Beaumaris, and at St. Michael's Mount, the Hydrangea is a showy plant till the end of the year; the mounds are not seldom 20—30 feet in circumference, and from 800 to 1,000 heads of flowers have been produced in a single season. *Hydran'gea quercifo'lia* (Bot. Mag. xxv. 975.) has large, deeply-lobed sinuate leaves, and great corymbs of white flowers which are mostly neuter. The flowers are white also in the *Hydran'gea arbores'cens*, but mostly perfect. *Hydran'gea radia'ta* or *ni'vea* resembles the wild guelder-rose more nearly than any. Of the other representatives of this family, the best are the *Ada'mias*, evergreen shrubs with blue flowers, from the East Indies, as *Ada'mia cya'nea*, (Wallich, *Pl. Asiat. Rar.* iii. 213.) and the favourite old *Bau'era rubiæfo'lia* of New South Wales. (Bot. Mag. xix. 715.) This last is a slender shrub, growing 3—6 feet high; the leaves are ternate, sessile, and opposite, resembling whorls of six; the flowers are axillary, nearly an inch across, rose-coloured, and tetramerous, with many stamens.

The *Cunonia'ceæ* all require the shelter of glass. *Cuno'nia Capen'sis* (Bot. Reg. 828.) is a handsome tree with fine glossy green foliage, and numerous branches of small white flowers. *Callic'oma serratifo'lia*, from New South Wales, (Bot. Mag. xliii. 1811.) has lanceolate and deeply-serrated leaves, and axillary tufted heads of yellow flowers, like those of Acacias. *Ceratopet'alum* is another fine greenhouse plant, with yellow flowers in terminal panicles, and ternate leaves. *Weinman'nias* are very interesting in their peculiarly pinnated leaves, the numerous joints being shaped like little kites, and attached end to end. *Geis'sois racemo'sa* has quinate leaves, and long dense racemes of brilliant crimson flowers. *Acrophyl'lum veno'sum* (Bot. Mag. lxx. 4050.) is a shrub from New Holland, about 18 inches high, with oblong-ovate leaves, deeply and regularly serrated, green above, whitish below, and somewhat recurved. The flowers are borne in long, erect, and interrupted racemes, every peduncle divided into many pedicels, and of a reddish colour, which very prettily sets off the white of the petals. The raceme is crowned with a tuft of leaves similar to those of the stem, and of a reddish hue, and giving the plant the very singular appearance expressed in the name.

LXXV. THE LYTHRUM FAMILY.—*Lythra'ceæ.*

A family of about 300 species, the greater portion of which are herbaceous or under-shrubby. Many are semi-aquatic, and contribute greatly to the picturesque effects of stream and river scenery. A few are arborescent and confined to the tropics.

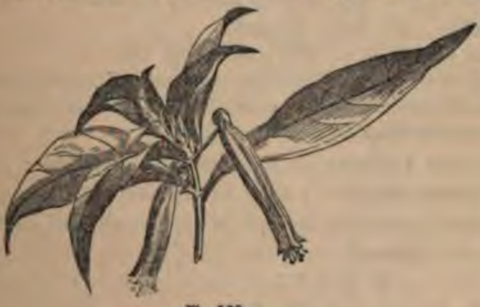

Fig. 123.
Cu'phea ig'nea (natural size.)

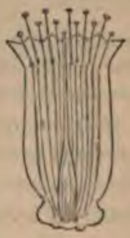

Fig. 124.
Flower of the same enlarged, and opened so as to show the eleven stamens.

Stems (at least in the herbaceous species) frequently four-cornered, like those of Labiates. Leaves simple and undivided, entire, without stipules, and opposite, or mostly so, with a tendency to become whorled, in which case the angles of the stem increase in number. Flowers axillary, or clustered in terminal and leafy racemes or spikes; occasionally in umbellate heads. Calyx tubular and often angular, with as many or twice as many teeth as there are petals; the latter inserted into its upper extremity, 4, 5, or 6 in number, often very fugitive, and occasionally absent. Stamens seated upon the calyx, and usually lower down in it than the petals, the number of which they either equal or double. Ovary solitary and free. Fruit a small many-seeded capsule of thin texture, covered by the permanent calyx, but not united to it.

Three species grow wild in Britain, all with trimerous flowers.

1. Stems 2—4 feet high, square, and slightly branched: leaves oblong, sessile, entire, 2—3 inches in length; usually opposite, but sometimes in threes or fours, in which case the stem is many-angled: flowers reddish-purple, in dense whorls in the axils of the upper leaves, forming handsome tapering spikes 6—18 inches long. Petals six, flaccid; stamens about twelve. PURPLE LYTHRUM.
2. Stems 6—8 inches high; leaves sessile, barely half an inch long, the upper ones alternate; flowers small, purple, solitary in the axils of the upper leaves; stamens six. HYSSOP-LEAVED LYTHRUM.
3. Stems 2—4 inches high, numerous and creeping; leaves tapering into short stalks; flowers as in the preceding, but in the axils of nearly all the leaves, and sessile. Petals usually absent; stamens six. PEPLIS.

HABITATS AND DISTRIBUTION.

1. PURPLE LYTHRUM—*Lyth'rum Salica'ria.*

Pondsides, banks of rivers, and marshy places; abundant. Sometimes in moist cornfields. Fl. July, August.

Curtis, i. 173; E. B. xv. 1061; Baxter, iii. 229.

One of the most showy of our native plants, the stems generally growing many together; their splendid spikes towering above the rushes and other semi-aquatics, like crimson sceptres, and at a distance resembling foxgloves.

2. HYSSOP-LEAVED LYTHRUM—*Lyth'rum hyssopifo'lium.*

Moist and muddy places, especially such as are subject to be inundated; rare, and seldom met with except in the south and east of England. Fl. August. Annual.

E. B. v. 292.

3. PEPLIS—*Pep'lis Por'tula.*

Ditches and watery places, especially such as are apt to become dry in summer; frequent, except in Scotland. Fl. July, August. Annual.

Curtis, ii. 244; E. B. xvii. 1121; Baxter, iii. 220.

Heim'ia or *Nesæ'a salicifo'lia* (Bot. Reg. N. S. iv. 60.) is a tall and handsome Mexican plant, with spikes of yellow flowers and willow-like foliage. *Grisle'a* *tomento'sa*, from the East Indies, has tetramerous red blossoms, borne in umbellated heads, with the stamens very long and projecting beyond the corolla. The exquisite blossoms of the *Lagerstrœ'mias*, also from the East Indies, are produced in small terminal panicles, and have their six rosy-purple petals elevated upon little stalks, and the margins crisped or undulated in the manner of a well-known variety of the garden-cabbage. The leaves of these plants are roundish-ovate and glabrous, and the stems and branches have winged angles. *Cu'pheas* usually have tubular flowers, produced either in the axils of the leaves or in umbellated heads, the half-hardy species, such as *Cu'phea ig'nea* and *Cu'phea em'inens*, flourishing in the open borders till destroyed by frost. The blossoms of these latter are scarlet and yellow. *Cu'phea viscosis'sima* is a well-known annual, with purple flowers; *Cu'phea Circæoi'des* (Bot. Mag. xlviii. 2201.) bears no distant resemblance to the Enchanters'-nightshade; *Cu'phea Melvil'la* is an ornamental hothouse shrub, with a good deal of the aspect of the *Bouvar'dia coccin'ea*. The stamens of the genus *Cu'phea* are normally twelve; but in the *ig'nea* and others, although there are six lobes or points to the perianth, there are never more than eleven, a circumstance worthy of note, since, with this exception, the number eleven appears to be unknown to structural botany. Linnæus has no Class for endecandrous plants, but steps at once from those with ten stamens to those with twelve.

LXXVI. THE ELM-TREE FAMILY.—*Ulma'ceæ.*

Elms, the chief and typical species of this family, are long-lived and usually deciduous trees, often attaining considerable height, and with rough and rugged bark, which is sometimes corky. Their leaves, which are alternate, broadly-ovate, pointed, feather-veined, and strongly and often doubly-serrated, usually present an upper surface of remarkable roughness, and differ from those of all other trees in the peculiarity of the base, which, owing to the lamina coming much further down upon one side of the petiole than upon the other, is unsymmetrical, as represented in Fig. 125. Stipules are present when the leaves come out, but they very soon fall off. The small reddish-brown flowers appear before the foliage, and on the preceding year's twigs. They form dense, globular, and sessile bunches, rather more than half an inch in length and breadth, and which are so abundant as to make the branches appear knotted. The perianth is single, more or less irregular, pentamerous or nearly so, with 4—6 stamens, (the anthers of which are purple) and a solitary and two-celled ovary with two stigmas. The fruits are flat, thin, pale-green, and about half an inch long, each resembling a little membranous and veiny leaf, with a notch at the top, and a solitary seed in the centre. They ripen, when the climate permits, concurrently with the opening of the foliage; the clusters, mingled with the young leaves, presenting the appearance of dishevelled female hop-flowers.

Besides the elms, the *Ulma'ceæ* contain the Sugar-berry or Nettle-trees, so called from the sweetness of their hard and fleshy fruit, and from the resemblance of their leaves in form and roughness, though not in stinging properties, to those of most of the herbaceous species of *Urti'ca.* The fruit is the special character by which they are distinguished, there being few other differences of importance. The flowers are usually solitary and unisexual; but the leaves have the unsymmetrical base found in the elms, and the general aspect of the trees is much the same. They consist of a few kinds each of *Plane'ra* and *Cel'tis,* the species of the first of which grow to the height of 50—70 feet. They have smooth bark, like that of the beech, and small, greenish-brown flowers, solitary in the axils of the leaves, and produced upon shoots of the same year's development as themselves. The fruit is about the size of a pea. The species of *Cel'tis* also grow to a considerable height, producing their solitary though abundant little flowers in May, and as summer advances, their cherry-like fruits, which are yellow while young, and black when quite ripe, and hang upon the tree till the following spring. Two of this genus are in occasional cultivation—the American *Cel'tis occidenta'lis*, and the *Cel'tis austra'lis* of the South of Europe and its opposite shores. The sweet berries of the latter are believed to have been the food of the Lotophagi—that strange fruit which being once tasted, men desired never to return to their native country. To read that grand old fable as literal history is no doubt useful; but the lotos the poet spoke of was no plant of time or latitude.*

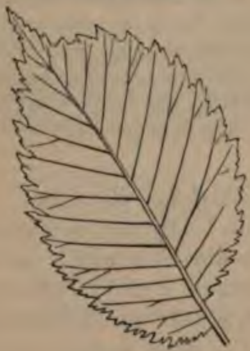

Fig. 125.
Leaf of Elm-tree.

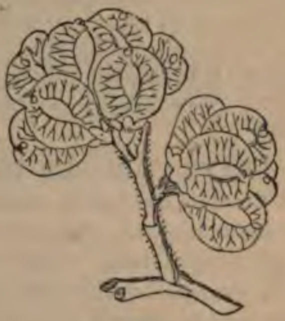

Fig. 126.
Clustered fruits of Elm-tree.

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* See "Life, its Nature, Varieties, and Phenomena," chap. xiv., &c., Ed. 2.

These interesting trees are natives of Europe, (especially the northern parts) northern Asia, North America, and the mountains of China and India, and number about sixty species. In the former countries they are valued for their timber, and for their frequent stateliness and picturesque habit of growth. The British representatives have not been made out satisfactorily. Some authors believe that there are no less than seven; but all the forms appear resolvable into two, and even these may possibly prove to be modifications of a single type.

1. A tall and erect-growing tree, attaining, under favourable conditions, the height of a hundred feet or more. Many of the principal branches are nearly erect, and stand like pillars among the masses of foliage.—Leaves small. Perianth usually four-cleft. Stamens usually four. Fruit (very rarely ripened in England) oblong, and deeply notched, the notch almost reaching the seed-bearing cavity. COMMON ELM.
2. A large, but not lofty tree, the branches spreading irregularly from near the ground, unless it be drawn up while young. No pillars among the upper foliage. Leaves often 3—4 inches long, and disposed upon the ultimate branches in such a manner as to make them look pinnated.—Perianth usually 5—6-cleft. Stamens 5—6. Fruit nearly circular, slightly notched at the top, the seed-bearing cavity placed considerably below the notch. WYCH ELM.

HABITATS AND DISTRIBUTION.

1. COMMON ELM—*Ul'mus campes'tris.*

Hedgerows and by waysides; seldom in woods, not being a true "forest-tree;" Squares in old cities; and in parks the most frequent tree after the oak. Common in the south and east of England; less so in the north and west, and in Scotland; and in the latter districts probably only where planted. Fl. March, April.

E. B. xxvii. 1886.

Whether standing alone upon the sward, or marshalled with a hundred others into one of those incomparable green arcades of which there is no finer example in England than the avenue leading to Redland Court, near Bristol, the grandeur and ancestral dignity of a full-grown elm never fail to awaken pride in our country's trees, and to lift up our hearts with delight and admiration. It is by no means certain however that the elm is truly indigenous. Central and southern and eastern Europe, and western Asia, are its aboriginal localities, and although apparently wild in England, it is probably only from long residence. A good test of a plant being really indigenous to a given country is its ability to multiply itself there naturally from seed, or without the assistance of man. This power is possessed by the *Ul'mus campes'tris* only in a very slight degree; and hence, in connection with other circumstances, a foreign origin is reasonably supposed. A variety with smooth leaves is the *Ul'mus gla'bra* of E. B. xxxii. 2248; and another with corky bark, full of deep fissures, has been treated as a species under the name of *Ul'mus subero'sa.* (E. B. xxxi. 2161.)

2. Wych Elm—*Ul'mus monta'na.*

Hedges, and in most places where trees grow, especially near river sides; the predominating wild elm of the north of England, Ireland, and Scotland. In the south-east rather uncommon. Fl. March, April.

E. B. xxvii. 1887; Baxter, v. 386.

When, in early spring, the bare, dark, upper twigs put forth their little baskets of flowers, insignificant as they are in the hand, the rich vinous tint they give to the tree is grateful and pleasing. Afterwards, in May and the beginning of June, the clusters of hop-like fruits form a new and conspicuous ornament, thickly covering the extremities of the young branches, and when they fall, the ground is strewed with them as plentifully as by the leaves of autumn. The foliage, like that of the *campes'tris*, before decay, turns brownish-yellow.

A variety with pendulous branches is common in gardens, at least in the north of England, and there is another with corky bark—perhaps the *Ul'mus ma'jor* of E. B. xxxvi. 2542. There are varieties also both of the *campes'tris* and the *monta'na* with variegated leaves.

LXXVII. THE SPINDLE-TREE FAMILY.—*Celastra'ceæ.*

Small trees or shrubs, with simple, undivided, alternate, or sometimes opposite leaves; the flowers in loose axillary cymes, small, and usually purplish-green. Sepals four or five, inserted into the margin of an expanded disk, and imbricated while in the bud. Petals four or five, flat, unconnected, and inserted by a broad base under the margin of the disk. Stamens the same number as the petals, and alternate with them. Ovary solitary, and immersed in the disk. Style very short. In some cases the flowers have no petals, and a few species have only two stamens.

A family with numerous representatives in the warmer parts of the world, many species inhabiting the Cape of Good Hope, but in Britain known only in the common Spindle-tree, except that a few of the exotics occur in gardens. The common Spindle-tree is usually a shrub of 3—5 feet high, but sometimes attains the stature of 25—30 feet, when it exchanges its usually slender stem for a trunk 12—18 inches in diameter. The latter is glabrous and green-barked. The leaves also are glabrous, in form lanceolate, about two inches in length, pointed, minutely serrated, and deciduous; the flowers are mostly tetramerous, yellowish-green, and borne in little cymes of 3—5, on peduncles shorter than the leaves. The capsule is unique among British plants. It is square, about half an inch across, flattened, with 4—5 prominent corners, and as many cells, and when ripe, opens by as many valves, so as to disclose the scarlet seeds, which are enveloped in a peculiar covering of a brilliant orange colour. This covering is called the *arillus*, and is a part of exceedingly rare occurrence.

HABITATS AND DISTRIBUTION.

COMMON SPINDLE-TREE—*Euon'ymus Europæ'us.*

Hedges, woods, and thickets; not uncommon, and flourishing best in calcareous earth. Very abundant in Forfarshire, where it attains its maximum size. Leigh Woods, near Bristol. Fl. May. Fruit ripe in September.

E. B. vi. 362; Baxter, ii. 123.

The fruit and the leaves are said to be deleterious. The tough white wood, like that of the cornel, is excellent for such things as skewers. A variety is sometimes found in gardens with the capsules *white*.

The broad-leaved Spindle-tree or *Euon'ymus latifo'lius*, (Bot. Mag. l. 2384.) the curious "warty-branched" or *Euon'ymus verruco'sus*, and two or three American species of the same genus, are common in shrubberies and pleasure-grounds, and in autumn are distinguishable by their abundant and beautiful capsules, formed exactly like those of the *Europæ'us*. The seeds of these often hang out by little threads, like those of the magnolia. The flowers of the *Euon'ymus atropurpu'reus* are tetramerous and dark-purple, with the petals circular instead of oval or oblong, as in the preceding. There are also some Asiatic species, but these are rarer. *Celas'trus scan'dens* is a glabrous and deciduous twiner from North America, rising to the height of 12—15 feet, with oval and serrated leaves, three inches long by two in width, and terminal racemes of small, pale-yellow and diœcious flowers, followed by orange-scarlet capsules, three-cornered and three-seeded. *Elæoden'dron In'dicum* is a strikingly handsome conservatory shrub, with large, opposite, pointed, and laurel-like leaves, perfectly glabrous, mottled in every part with greenish-white, and with the midrib and the veins of a deep and translucent crimson. *Ca'tha buxifo'lia* (Bot. Mag. xlvii. 2114.) and the diandrous *Mayte'nus Chilen'sis* are found in arboretums.

LXXVIII. THE BUCKTHORN FAMILY.—*Rhamna'ceæ.*

Trees and shrubs, in a few cases twining, and the branches often spinous. Leaves simple, undivided, and usually alternate. Flowers small, numerous, frequently green, occasionally white or blue, sometimes unisexual by defect. Calyx 4—5-cleft, the sepals valvate while in the bud. Petals 4—5, often minute, and often convolute or concave. Stamens of the same number, and opposite the petals; or if petals be wanting, as sometimes happens, alternate with the calyx-lobes.

The *Rhamna'ceæ* are found nearly all over the world, excepting in the Arctic regions. Warm countries possess the majority of the 250 known species, particular genera of which are often confined to definite areas. The fruits, when succulent or juicy, are sometimes eatable, sometimes of properties so violent as to fit them only for medicinal use, and occasionally are valuable for green and yellow dyes. Two species grow wild in Britain.

1. An erect and glabrous shrub or small tree, 4—8 feet high, and destitute of spines. Leaves alternate, broadly ovate, obtuse, entire or slightly-waved, feather-veined, and petiolate. Flowers minute, pentamerous, and bisexual, growing 2—3 together in the axils of the leaves, and followed by pea-like berries, which are pinkish-green while immature, when ripe of a dark-purple colour, and contain two seeds each. Fruit and tardy blossoms may often be found in company on the same branch. ALDER BUCKTHORN.
2. A glabrous shrub, rising to the height of 6—10 feet, with numerous straight and spreading branches, which, after the first year of growth, usually terminate in sharp spines. Leaves ovate, glabrous, and serrated; the earlier ones in tufts, the later ones opposite. Flowers numerous, minute, in axillary clusters, yellowish-green, tetramerous, and mostly unisexual and diœcious. Berries blueish-black, each with *four* seeds. SPINOUS BUCKTHORN.

HABITATS AND DISTRIBUTION.

1. ALDER BUCKTHORN—*Rham'nus Fran'gula.*

Moist woods and in low wet ground, as by pondsides and on the borders of marshes; frequent, except in Scotland. Very common near Manchester. In Cheshire on the drained edges of the mosses. Fl. May—July.

E. B. iv. 250 (not good); Baxter, iii. 219.

2. SPINOUS BUCKTHORN—*Rham'nus cathar'ticus.*

Hedges, groves, and thickets; rather uncommon, and preferring calcareous soil. In Scotland very rare. Fl. May, June. Berries ripe in September.

E. B. xxiii. 1629.

The berries of these two shrubs, though inviting to the eye, should never, on any account, be swallowed.

Several plants of this family occur in shrubberies and greenhouses. *Rham'nus Alater'nus* is an old-fashioned ornamental evergreen, with serrated leaves, and axillary clusters of small, greenish-yellow, and honey-scented flowers, produced abundantly in March and April. *Paliu'rus aculea'tus*, (Bot. Mag. xliv. 1893.) a little shrub with innumerable pungent thorns extending the whole length of its flexile twigs, is believed to have been the plant resorted to for the crown on the day of the Crucifixion. The various species of *Ceano'thus* are pleasing in the abundance of their panicled and white or blue pentamerous flowers, especially the "New Jersey-tea" or *Ceano'thus America'nus*, (Bot. Mag. xxxvi. 1479.) and the *Ceano'thus thyrsiflo'rus* (Bot. Reg. N. S. vii. 38.) both from North America. Under glass there are two or three species of *Pomader'ris* from New Holland; (Bot. Mag. xxxvii. 1510, lx. 3212.) several *Phy'licas* and *Soulan'geas* from the Cape of Good Hope; and occasionally the very beautiful *Tryma'lium odoratis'simum*, also from New Holland, with fragrant and snow-white flowers produced in large and drooping clusters. *Œno'plias* are pretty twiners.

LXXIX. THE HOLLY FAMILY.—*Aquifolia'ceæ.*

Evergreen trees and shrubs; the branches often angular; the leaves simple and leathery; the flowers small, regular, white or greenish, axillary, solitary or clustered, and in some respects like those of the *Celastra'ceæ*, from which family the present is positively distinguished by the 4—5—6 petals being part-way united, and having the 4—5—6 stamens seated upon them, instead of inserted below a disk. The fleshy and indehiscent fruit constitutes another important feature by which to distinguish these plants from the *Celastra'ceæ;* and from the *Rhamna'ceæ*, which they also resemble, they may be told by the imbricated æstivation of the calyx.

The species are natives principally of North and South America, the West Indies, and the Cape of Good Hope, and include a good many plants useful to man, the most celebrated being the shrub which yields *maté* or Paraguay-tea, extensively used as a beverage in Brazil and the adjoining governments. This is the *I'lex Paraguayen'sis.* (Bot. Mag. lxix. 3992.) Not many are cultivated for ornament. *I'lex Dahoon*, *I'lex Cassi'ne*, (Catesby, "Carolina," i. 31.) and *I'lex Chinen'sis*, (Bot. Mag. xlvi. 2043.) a few species of *Cassi'ne* from the Cape of Good Hope, esteemed for their foliage, and of *Pri'nos* from North America, are occasional inmates of gardens, but the only one generally cared for is the common European holly. The tall and sturdy figure, the symmetrically conical form, (when not disturbed) the glossy and perennial foliage, with the fine *chiar'oscuro* effects produced by the innumerable waves of the leaves, and the gay bracelets of scarlet berries with which its branches are encircled all through the winter, may well have given preëminence to this beautiful tree, as well have rendered it the most popular of British plants. Identified, moreover, with Christmas under the roof of Home, no tree we are accustomed to contemplate gathers round it so many sacred associations, and where love leads the way, the eyes are never slow to admire.

In its wild state, the holly-tree often attains the height of 30 feet. When cultivated, it grows to twice that stature. It does best when surrounded by other trees, not much taller than itself, so as to be shaded, without being overtopped. The leaves are sometimes quite entire and nearly flat. The little white flowers, growing in axillary and nearly sessile clusters, are usually tetramerous and bisexual, but often five-lobed and in part unisexual. The berries are occasionally yellow or white, and frequently keep their places until the summer that succeeds the winter of their ripeness, the new green ones, and the old scarlet, uninjured by the severest frost, glistening side by side.

HABITATS AND DISTRIBUTION.

COMMON HOLLY—*I'lex Aquifo'lium.*

Hedges and woods, especially upon light and gravelly soil; often, without doubt, from the hand of man, but truly wild also in every part of Great Britain, except the north-east of Scotland. Most natural woods, however, in the south and middle of Scotland, contain it as an undergrowth to oak, ash, and pine. Some of our finest native hollies occur in the New Forest; and in Needwood Forest, Staffordshire. Fine trees occur also near Killarney, though in Ireland this plant is not generally frequent. Fl. May. Berries ripe in December.

E. B. vii. 496; Baxter, iv. 262.

The variegated hollies which so greatly ornament our gardens and plantations, and the smooth or thornless kinds, are varieties, induced by cultivation, of the common *I'lex Aquifo'lium.*

The porcupine-holly, which has the edges of its very small leaves rolled back, so as to give them a somewhat cylindrical figure, and has the surface as well as the margins, crowded with thorns, may possibly be a distinct species, especially if it be true, as reported, that the berries are black.

LXXX. THE EBONY FAMILY.—*Ebena'ceæ.*

These are trees and shrubs, chiefly Indian and tropical, though occurring also in North America, southern Europe, and New Holland. Some are remarkable for the heaviness, the hardness, and the dark colour of their wood; others for the extreme acerbity of their fruit previous to ripeness. The blackness of ebony is proverbial. Very few species are cultivated, and none of any interest except the "Date-plum" or *Diospy'ros Lo'tos*, and the Persimon or *Diospy'ros Virginia'na.* The former is from the shores of the Caspian Sea, where it attains the altitude of 30 feet, though in England not half that height. The leaves are alternate, oblong and acuminate, entire, of a dark glossy green upon the upper surface, and upon the under one downy and pinkish. In autumn they do not change colour, but drop off with the first sharp frost. The small reddish-white flowers are axillary, nearly sessile, tetramerous, in form not unlike those of the Lady's-mantle, and partly male only, partly bisexual. The stamens are inserted by pairs into the base of the 4-cleft corolla, and are of course exactly eight. The fruit is the size of a small cherry, yellow when ripe, in its native country sweet with astringency, but in England, where the tree is too tender to flourish or become common, very austere. This tree received its name from the belief that the fruit was the lotos of the Odyssey; but that, as stated on p. 308, (if an actual fruit be spoken of) was more probably the produce of the Celtis. *Diospy'ros Virginia'na* is American, and distinguished from the preceding by its large leaves, which are 4—6 inches long, and green on both surfaces. The stature is often 40 feet. *Ma'ba buxifo'lia* from the East Indies, and a few *Roye'nas* and *Eucle'as* from the Cape of Good Hope, are grown sometimes for their foliage, but their flowers are of no beauty. Ebony-wood is furnished by the *Diospy'ros Ebe'num* and the *Diospy'ros melanox'ylon* of tropical Africa and the East Indies.

LXXXI. THE PENÆA FAMILY.—*Penæa'ceæ.*

The *Penæa'ceæ* are little shrubs with pleasing flowers, natives of the Cape of Good Hope, to the extent of 20 or 30 species. All are evergreen; the leaves are opposite, and decussate or imbricated; the flowers are tetramerous, with either four or eight stamens, and consist of a tubular calyx only, with four free lobes; the ovary is 4-celled, and the style and stigma are each 4-cornered. Outside the calyx are two or more rather large bracts, simulating sepals, and making it appear as if the former were a corolla. The filaments of the stamens adhere to the inner surface of the calyx; the anthers are large and cordate.

Penæ'a mucrona'ta, *P. squamo'sa*, and several others, occur in greenhouses. *P. imbrica'ta* (Bot. Mag, lv. 2809.) has terminal heads of red flowers, and abundance of ovate and sessile leaves, the general figure of the plant being that of a small *Cras'sula coccin'ea.* The same colour and mode of arrangement of the flowers prevails nearly throughout the family.

LXXXII. THE SNOWDROP-TREE FAMILY.—*Styraca'ceæ.*

A small family of tropical and sub-tropical trees and shrubs, reaching in a very few instances into colder latitudes. In Britain they are known only in the rare Storax-tree of Syria, and in the Snowdrop-trees of North America. The latter grow to the height of 15—20 feet, producing alternate, ovate, acute, and serrate leaves, and abundant lateral clusters of pendulous white flowers, in form and appearance not unlike the spring blossom from which they are named, and on peduncles as long as those of cherries. The calyx is four-toothed; the corolla consists of four partially united petals; the stamens are usually eight or twelve, and the ovary is solitary. *Hale'sia tetrap'tera*, the common Snowdrop-tree, is figured in Bot. Mag. xxiii. 910, and in Catesby's "Carolina," i. 64.

The Storax-tree, or *Sty'rax officina'le*, celebrated for its fragrant balsam, has ovate leaves, about two inches long, green and shining upon the upper surface, hoary upon the under one; and thin, axillary clusters of cream-coloured flowers, with a 5—6-cleft corolla and ten projecting stamens. The aromatic gum-resin called Benzoin is yielded by another species of the same genus.

LXXXIII. THE PERIWINKLE FAMILY.—*Apocyna'ceæ.*

A large and splendid family of the tropics, abounding especially in the hotter parts of Asia, which it greatly assists to ornament, but, like the Ranunculaceæ of the north, in many cases venomous, and very generally to be suspected, though now and then yielding eatable fruit. A few scattered representatives only are thrown out into temperate and cold countries, such as the dogs'-bane of North America, and some of the pretty plants comprised in the genus *Vinc'a*. A great diversity of character pertains to them; in one curious point they seem,

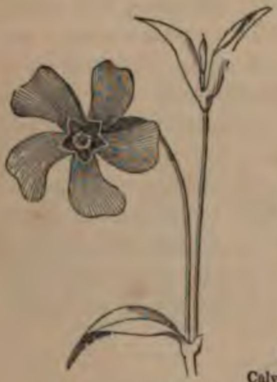

Fig. 127.
Vinc'a mi'nor (Small Periwinkle.)

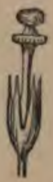

Fig. 128
Calyx and pistil of
Vinc'a.

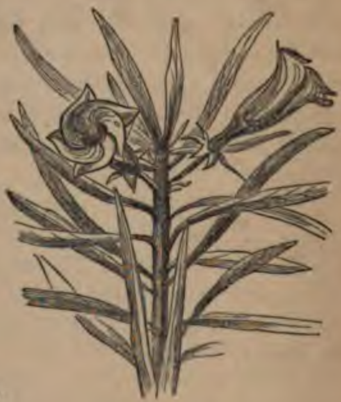

Fig. 129.
Cer'bera Theve'tia.

however, to correspond universally, namely, in the structure of the stigma. This organ is elevated upon a long style, and consists of a massive head, expanded at the base into a ring-like disk, and in the middle contracted, so as to resemble a pillar with a double capital. (Fig. 128.) The flowers are regular, and formed of five petals, usually adherent by their edges for the greater part of their length, and frequently having the free portions semi-lunate, or with unequally-curved margins, so as to suggest the idea of a rolling wheel. (Figs. 127, 129.) Hence this form of corolla is called "rotate." Linnæus, for the same reason, named the family *Contor'tæ.* The stamens are five in number, and inserted in the tube of the corolla. The leaves are generally opposite, sometimes in whorls of three or four, and always quite entire.

Two species are accounted British.

1. Flowerless stems 2—4 feet long, trailing, cord-like, and clothed with broadly-ovate leaves, which are 2—3 inches in length, pointed, evergreen, and shining. Flowering-stems simple, and rising almost vertically to the height of 12—18 inches. Flowers axillary and solitary, the size of a florin, flat, and deep purplish-blue. Mouth of the tube five-angled, and closed with hairs. Sepals linear, acute and *ciliated.* COMMON PERIWINKLE.
2. Like the former, except that the plant is smaller in every part, and has narrower leaves, and that the sepals are shorter, broader, and *not ciliated.* SMALL PERIWINKLE.

HABITATS AND DISTRIBUTION.

1. COMMON PERIWINKLE—*Vinc'a ma'jor.*

Hedges, thickets, and on the borders of woods; not uncommon, but in many places no doubt of garden origin. Fl. February—June, and often again in autumn.

Curtis, ii. 236; E. B. viii. 514; Baxter, ii. 158.

2. SMALL PERIWINKLE—*Vinc'a mi'nor.*

Bushy places, and upon hedgebanks, especially where moist; sometimes on the banks of rivers: not rare, but very doubtfully wild. Fl. spring and summer.

Curtis, i. 161; E. B. xiii. 917.

Both species are extremely common in gardens, where they vary with white, reddish, and sometimes double flowers, and with variegated leaves. In the *Vinc'a ma'jor* the leaves are sometimes reticulated with yellow in such a way as to resemble the gold-lace-leaf orchid or *Anæctochi'lus.* The blossoms of both species furnish exquisite objects for the microscope, alike in the singular stigmas, and in the stamens, which are shaped like a note of interrogation.

In hothouses there are many very beautiful plants of this family. The commonest are the *Allaman'das*, which are usually trained, like vines, close under the glass, and have superb bell-shaped flowers of the deepest yellow. *Diplade'nias* have magnificent rose-coloured flowers. Various species of *Echi'tes* are esteemed for the rich red veining of their leaves, as seen in the *Echi'tes sanguinolen'ta* and the *Echi'tes nu'tans*. (Bot. Mag. li. 2473.) The genus *Hæmadic'tyon* is equally valuable in this respect. Much, however, depends upon the angle at which the leaves are viewed. In *Strophan'thus*, the long narrow yellow petals are curiously twisted. *Mandevil'la suave'olens*, (Bot. Mag. lxvii. 3797.) sometimes called the "Chili Jasmine," is highly fragrant. *Plumie'rias* have showy red flowers; as *P. ru'bra* (Bot. Mag. viii. 279.) and *P. acumina'ta* (lxviii. 3952.) The genus *Ne'rium* contains the celebrated and prolific Oleanders, the flowers of which, when double, as very commonly, might be mistaken for roses, only that the leaves below them are linear-lanceolate, exstipulate, and in whorls of three. *Ne'rium odo'rum* is figured in Bot. Mag. xlvi. 2032. Visitors to Paris in the month of July cannot fail to remember the oleanders at the corners of every street near the *Palais Royal*, where they resemble great camellia bushes. Unfortunately this plant acts as a formidable poison. Many of the species already mentioned are twiners. Others of this nature are the beautiful white-flowered *Beaumon'tias*, (Bot. Mag. lx. 3213.) and the *Melodi'nus scan'dens*. *Wright'ia coccin'ea* (Bot. Mag. liii. 2696.) has splendid crimson flowers; those of the *Rhynchosper'mum*, from Shanghai, resemble white jessamine. *Camera'rias*, as *C. du'bia*, (Bot. Mag. xl. 1646.) are more usually orange or yellow. The same is the tint of the fragrant flowers of the *Gelse'mium sempervi'rens*. *Taber'næmonta'na*, (Bot. Mag. xliv. 1865.) *Amso'nia*, (xliv. 1873.) and *Cer'bera*, (xix. 737, xliii. 1845.) are genera of no less interest, especially the last-named, the seeds of which furnish a deadly poison, as poetically expressed in the name. The rotate corolla is more perfectly exemplified in the yellow and fragrant-flowers of the *Cer'bera Theve'tia* (Bot. Mag. xlix. 2309.) than in any other member of the family. The common periwinkles are renewed indoors in the lovely *Catharan'thus ro'seus*, the flowers of which are flat and circular, and of the purest white. In the variety *ocella'tus* the centre is pink. *Apo'cynum*, the genus which gives name to the family, consists only of inconspicuous and hardy herbaceous plants. The commonest is *Apo'cynum androsæmifo'lium*. (Bot. Mag. viii. 280.)

LXXXIV. THE TOOTHWORT FAMILY.—*Orobancha'ceæ.*

The members of this family are examples of true parasites, in habit and manner of growth resembling the *Monot'ropa*. In the structure of their flowers they agree, however, with the fox-glove; and in that of the fruit, and in some other points, with the *Gentiana'ceæ*. The corolla is usually tetramerous, irregular, and tubular, with an open mouth; the stamens are four in number, didynamous, and seated upon the petals; the ovary is solitary, formed of two carpels, solitary, and many-seeded.

As stated under *Monot'ropa*, (p. 172.) genuine parasites rarely have any green about them. In the present family this colour is totally unknown, every part of the plant being of a uniform pinkish or yellowish hue, which eventually changes to a rusty reddish or dusky brown. The stems, which are erect, often glandular, and usually simple, rise to the height of 6—12—20 inches. In place of leaves, they are clothed with pointed scales, chiefly developed at or near the base, and in some cases much thickened. The flowers are borne in terminal spikes, which in their youngest state are dense and crowded, in form somewhat resembling great heads of asparagus, and often give the plant a club-like figure. Subsequently the spikes are often much elongated, and the lower and middle flowers are drawn to a long distance from one another. Most of the species seat themselves upon the roots of trees and shrubs, such as ivy, hazel, furze, broom, and black-poplar; but a few prefer clover, the wild carrot, hemp, knapweed, yarrow, &c.; some appearing to thrive only on a single kind of plant, or at most only upon two or three closely allied ones, while others will grow upon a variety of plants, and such as possess no immediate affinity. How far the configuration and colour of the parasite are affected by the peculiar sap of the plant on which it feeds, is not yet ascertained. There is reason to believe that the influence of the stolen nourishment is considerable, and that the number of species appears in consequence very much larger than it really is.

The seeds appear to be capable of lying dormant in the ground until they are brought into contact with the plant they require for sustenance, when they immediately vegetate. One species, the *Oroban'che mi'nor*, has been known to spring up in greenhouses, in contact with the roots of Pelargoniums. Light, which usually attracts plants so powerfully, in these, as in the case of the Fungi, meets with no response, and sometimes seems scarcely necessary to their development.

Almost all parts of the northern hemisphere are acquainted with these singular plants, and a few species are found at the Cape of Good Hope.

Eight grow wild in Britain.

A.

Underground part of the stem branched, and clothed with short, thick, fleshy white scales, resembling the front teeth. Stem 3—6 inches high, pale pinkish or cadaverous, succulent, and terminating in a crowded spike of flowers which are *all turned one way*. Calyx tubular and inflated, with four *short and broad* lobes. Corolla two-lipped. 8. TOOTHWORT.

B.

No fleshy white scales upon the underground part of the stem, which is generally swollen at the base, so as to resemble a bulb. Scales of the aërial portion thin and tapering. Calyx deeply cleft into 2—4—5 *pointed* lobes. Corolla 4—5-cleft.

1. Only one bract under each flower.

  a. Plant usually slender, and not exceeding a foot in height, unless when drawn up by growing under bushes. Spike of flowers short and dense, or if much drawn out by growing in shade, the lower blossoms distant from one another.

    Plant light yellowish-brown, sometimes rather purplish, and the flowers often tinged with blue. Tube of the corolla narrowed above the base. Stamens hairy at the lower part. Stigma purple or yellowish. Growing chiefly upon ivy. Stems 6—20 inches high.
    4. COMMON BROOMRAPE.

    Plant dingy-brown or reddish. Tube of the corolla broad.

      Lobes of the calyx narrow and entire, or sometimes unequally divided. Plant reddish-brown, growing upon wild-thyme, scarcely a foot high. Flowers fragrant. Stigma pale-red. 5. RED BROOMRAPE.

      Lobes of the calyx equally divided. Plant yellowish at first, afterwards dingy purplish-brown, and growing chiefly upon *Ga'lium Mollu'go.* Flowers with the scent of honey-suckle or cloves. Stamens hairy. Stigma dark-purple. Style pubescent.
      2. CLOVE-SCENTED BROOMRAPE.

  b. Plant stout, the stem much thickened at the base, 1—2—3 feet high. Flowers 70—80, forming a dense spike of at least half the length of the plant, and the lower ones not distant from one another.

    Plant dingy-brown, pubescent and viscid, and growing chiefly upon broom and furze. Lower part of the stamens *glabrous.* Style downy.
    1. GREATER BROOMRAPE.

    Plant more or less yellow, growing chiefly upon the *Centau'rea Scabio'sa.* Lower part of the stamens *densely hairy.* Stigma yellow. Style glabrous.
    3. CENTAURY BROOMRAPE.

2. Three bracts to every flower; one at the base of the very short peduncle, (as in all other Broomrapes) and two smaller ones at the base of the calyx.

    Stem always simple, 6—7 inches high. Plant of a markedly bluish-purple hue. 6. PURPLE BROOMRAPE.

    Stem usually branched, seldom above 6 inches high. Plant growing chiefly upon hemp, and of a very light colour.
    7. BRANCHED BROOMRAPE.

HABITATS AND DISTRIBUTION.

1. GREATER BROOMRAPE—*Oroban'che ma'jor.*

Upon the roots of broom, and occasionally upon those of furze and other under-shrubby leguminous plants, when growing in dry and gravelly places; not very uncommon. Fl. June, July.

Curtis, ii. 264; E. B. vi. 421.

2. CLOVE-SCENTED BROOMRAPE—*Oroban'che caryophylla'cea.*

Apparently confined to the county of Kent, where it is found upon the roots of the *Ga'lium Mollu'go.* Said also to occur upon the roots of the common bramble. Fl. July.

E. B. Supp. i. 2639.

3. CENTAURY BROOMRAPE—*Oroban'che ela'tior.*

Noticed hitherto only upon the roots of the *Centau'rea Scabio'sa,* and exclusively in the south-east of England; extremely rare. Fl. July, August.

E. B. viii. 568.

4. COMMON BROOMRAPE—*Oroban'che mi'nor.*

Parasitic upon ivy and various other plants; not uncommon, and in the south and west of England, frequent. Fl. July, August. Annual?

E. B. vi. 422; Baxter, v. 381.

Out of this species there have been made in recent times no less than four, the reputed differences consisting chiefly in the form and colour of the stigma. The most frequent is the *Oroban'che He'deræ* or *barba'ta,* (E. B. Supp. iii. 2859.) found upon the roots of ivy, when trailing upon dry hedgebanks in calcareous earth, or concealing the bottoms of walls, or mantling noble ruins, such as those of castles. The stigma of this is *yellow.* Near Bristol it is not infrequent, and on Conway Castle is reported "abundant." In *Oroban'che amethys'tea* or *Eryn'gii,* a rare variety found only upon the Eryngo and the wild carrot, on the coasts of the extreme south-west of England, the stigma is *purple,* and the lobes are attached for one-fourth of their length. *Oroban'che Pic'ridis* has a violet-coloured stigma, and is also very rare; while the true *Oroban'che mi'nor* is said to be parasitic almost exclusively upon the common honey-clover, showing itself after the grass has been cut. The absence of any *bonâ fidê* differential characters, and the connection of the several forms with distinct sources of nutriment, renders it probable, as above stated, that *Oroban'ches* are by no means of so many kinds as commonly thought, and that difference of food may have more to do than has been discovered with the unlikeness even of those esteemed "good species."

5. RED BROOMRAPE—*Oroban'che ru'bra.*

Basaltic rocks in the north of Ireland, the Hebrides, and on the western coast of Scotland, parasitic upon wild thyme. Staffa. Giants' Causeway. Cave Hill, near Belfast. Also upon magnesian rocks at the Lizard Point, Cornwall. Fl. July.

Curtis, iii. 507; E. B. xxv. 1786 (bad.)

6. Purple Broomrape—*Oroban'che cæru'lea.*

Grassy pastures near the sea, parasitical on various herbaceous plants; rare. Norfolk, not uncommon. Channel Islands. Hampshire. Isle of Wight. Fl. July.

E. B. vi. 423.

7. Branched Broomrape—*Oroban'che ramo'sa.*

Upon the roots of hemp; very rare. Norfolk and Suffolk. Channel Islands. Fl. August, September. Annual.

E. B. iii. 184.

8. Toothwort—*Lathræ'a Squama'ria.*

Woods and shady places, living recluse from public view, and seated usually on the roots of hazels and black poplars, preferring such as are not far from streams of water; common. Often half-concealed among rotten leaves. Frequent near Manchester. Fl. April, May.

E. B. i. 50; Baxter, v. 365.

LXXXV. THE GENTIAN FAMILY.—*Gentiana'ceæ.*

The Gentians and their kindred constitute a rather extensive family, and are plants, generally speaking, of great interest and considerable beauty. Almost all are herbaceous and terrestrial; the colours of their abundant flowers are of singularly deep tone and clear brightness; and with the exception of a few aquatic and semi-aquatic species, distinguished as the *Menyanthoi'deæ,* they are in every case extremely well marked. In the terrestrial species, the stems and even the branches are unusually erect and straight; the surface, except in a few exotics, is everywhere perfectly glabrous; the leaves are opposite, sessile, simple and undivided, invariably entire, destitute of stipules, and very often ribbed; the flowers are regular, usually pentamerous, but occasionally with the parts in fours, the sepals and petals both more or less united by their edges, so as usually to form a tubular or bell-shaped calyx and corolla; the stamens correspond in number with the petals, alternating with them, and standing in a single row, and occasionally have their anthers adherent while young; the stigma is frequently cleft, the style is often absent, and the ovary, which is free and solitary, ripens into a many-seeded capsule, one or imperfectly two-celled, and opening by two valves.

In many species, at least of *Gentia'na,* the usually clear colour of the petals is exchanged for quaint ornament with speckled stripes; in others, the corolla is decorated with long hairs of its own tint, or the orifice of the tube is fenced with a coloured fringe. The flowers, except in the very dwarf species, are very commonly borne in terminal and dichotomous cymes, with a solitary blossom in every fork, and are often of surprising multitude for the size of the plant. Extreme sensitiveness to the light is another marked peculiarity, the corollas of some being never opened except in sunshine, when they are found to be cup-shaped, or flat and starlike.

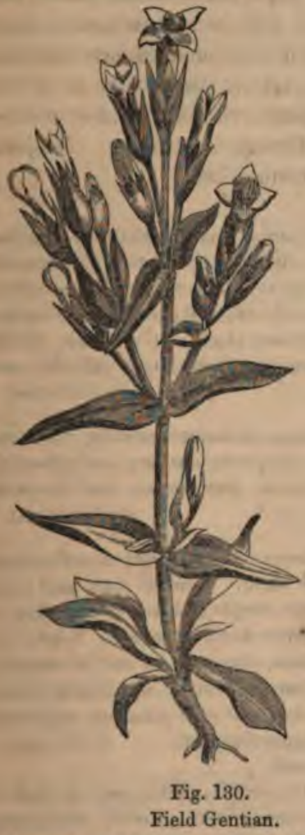

Fig. 130.
Field Gentian.

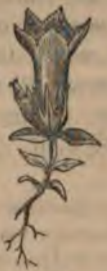

Fig. 131.
Autumnal Gentian (miniature form.)

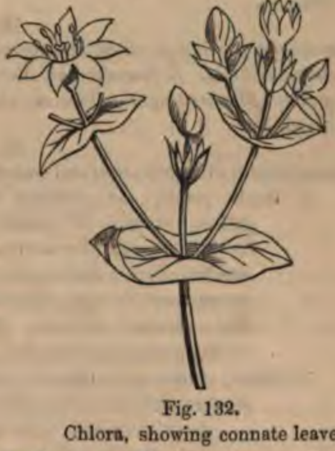

Fig. 132.
Chlora, showing connate leaves.

The small section of aquatics and semi-aquatics, named after the *Menyan'thes*, presents no differences in the flowers and fruit, the unlikeness consisting merely in the habit and foliage. The stems are prostrate and sometimes floating; the leaves are always petiolate; and those of the *Menyan'thes* are three-cleft.

These beautiful and engaging plants are diffused almost all over the world, ascending to the regions of perpetual snow upon the summits of the mountains of Europe, and tenanting the hottest sands of India and South America. Their properties are of the rarest uniformity. Pure and intense bitterness in every part—root, stems, leaves, and flowers—is their eminent characteristic, and, as a consequence, many species are esteemed in medicine. About five hundred have been discriminated, and of these there grow wild in Britain ten or eleven. *Swer'tia peren'nis* (E. B. xxi. 1441: Baxter, vi. 498.) is now omitted from the lists, having been inserted through a mistake. *Gentia'na acau'lis* (E. B. xxiii. 1594.) is not even naturalised.

A.

Leaves ternate, the lobes obovate, and 1—2 inches long. Petioles 6—8 inches long. Stem short; creeping, if on land; floating, if in water. Flower-stalk 6—12 inches high, terminating in an upright raceme of 6—8 elegant pentamerous white blossoms, tinged externally with red, and upon the inner surface bearded with long white filaments. Anthers black and versatile; pollen golden-yellow. Stigma very slightly notched. Seeds large, yellowish, and shining. 10. Bog-bean.

B.

Plant always floating in water, and resembling a miniature water-lily, the stems many feet long. *Leaves circular*, the size of a penny, leathery, and yellowish-green. *Flowers bright yellow*, an inch across, pentamerous, and the petals fringed. 11. Villarsia.

C.

Dry-land plants, with *erect stems* and *opposite leaves*. Seeds numerous and minute.

1. Sepals, petals, and stamens *eight* each. Flowers deep and vivid *yellow*. Stem 4—20 inches high; simple or branched according to its stature; the flowers in a corymb at the extremity. Leaves triangular, sessile, and mostly connate, the pairs few and far asunder, except near the root, where the leaves are tufted, and usually oblong and somewhat petiolate. Whole plant very glaucous, especially when growing near the sea. Stigma four-cleft. 6. Chlora.
2. Sepals, petals, and stamens *four* each.
    - Flowers dull blue or purplish, the corolla tubular, and an inch or more in length. Stem 2—6 inches high, generally with numerous erect branches, crowded with leaves and flowers, sometimes to the number of 100, though in alpine specimens there may be but one. Two of the calyx-lobes broadly ovate, and much larger than the other two. Petals conspicuously fringed. 5. Field Gentian.
    - Flowers pale-yellow, pinkish, or nearly white. Stem very slender, 1—2 inches high, and more or less branched.
        - Lobes of the calyx linear. 9. Dwarf Cicendia.
        - Lobes of the calyx broad and short. 8. Common Cicendia.

(*Dry-land plants*, with *erect stems* and *opposite leaves*. Seeds numerous and minute.)

3. Sepals, petals, and stamens *five* each.

Flowers *bright-red, rose-coloured, pink*, or *almost white* ; occasionally pure white. Sepals very slightly united, rendering the calyx "deeply five-cleft." Stem 1—18 inches high, more or less branched, according to the stature. Leaves broadly-lanceolate. Flowers in thin, forked, and flat-topped corymbs; in diminutive plants almost solitary; and opening only in sunshine. Anthers twisted spirally after shedding their pollen. 7. Blushwort.

Flowers *blue* or *purplish*. Sepals united for at least half their length, so as to form a tubular calyx.

Corolla *fringed in the throat with lilac hairs*. Stems 3—12 inches high, usually crowded with short axillary branches, leaves, and flowers, the latter about an inch long, sometimes exceeding 100 in number, and nearly erect. Plant usually with a livid-green or purplish tinge. Calyx-lobes all narrow-lanceolate.
4. Autumnal Gentian.

Throat of the corolla *not fringed*. Flowers few. Stems simple.

Stem 4—10 inches high. Leaves linear. Flowers more than an inch long, deep-blue, with five longitudinal green plaits. Anthers coherent until separated by the swelling ovary.
1. Purple Moor Gentian.

Stems rarely exceeding 3—4 inches in height, and usually much less. Corolla less than an inch long, with small 2-cleft lobes between the five principal ones.

Perennial. Stems one-flowered. Corolla bright blue.
2. Early Mountain Gentian.

Annual. Usually with several flowers.
3. Small Alpine Gentian.

HABITATS AND DISTRIBUTION.

1. Purple Moor Gentian—*Gentia'na Pneumonan'the.*

Moist heaths and moors, especially in the northern counties.—Thurstaston moors, about seven miles from Birkenhead, abundant. Not found in either Scotland or Ireland. Fl. August, September.

E. B. i. 20; Baxter, iii. 185.

A garden variety called β *gutta'ta* (Bot. Mag. xxviii. 1101.) has the lobes of the corolla speckled with white.

2. Early Mountain Gentian—*Gentia'na ver'na.*

Alpine pastures; very rare. Teesdale, abundant. Connemara, west of Ireland. Fl. April.

E. B. vii. 493; Bot. Mag. xiv. 491.

3. Small Alpine Gentian—*Gentia'na niva'lis.*

Upon the loftiest Scotch mountains; local and rare. Ben Lawers, near the summit, very abundant. Fl. August. Annual.

E. B. xiii. 896.

4. Autumnal Gentian—*Gentia'na Amarel'la.*

Dry pastures, chiefly upon chalk and limestone; the commonest of the British species of this genus. Matlock, abundant. Fl. August, September. Annual.

Curtis, iii. 467; E. B. iv. 236.

5. Field Gentian—*Gentia'na campes'tris.*

Amid the virgin turf of uncultivated hills, especially where the soil is gravelly and chalky, and near the sea; common, and perhaps as frequent as the *Amarel'la.* Fl. August—October. Annual.

E. B. iv. 237.

6. Chlora—*Chlo'ra perfolia'ta.*

Dry pastures and slopes of hills, especially upon limestone; very common near the sea, and particularly so in the secluded plateaux among the sand-hills. Not found far to the north, nor in Scotland. Fl. July—October. Annual.

Curtis, iii. 485; E. B. i. 60; Baxter, i. 69.

Remarkable among British plants for the purity of its yellow, and for the deeply glaucous hue of the stems and foliage. After the teasel, it supplies the best native example of connate leaves.

7. Blushwort—*Erythræ'a Centau'rium.*

Dry pastures; slopes of dry, green hills; by waysides, and on banks and grassy flats near the sea: common all over Britain, except in the north of Scotland. Fl. July—September. Annual.

Curtis, ii. 239; E. B. vi. 417 (both as *Chiro'nia Centau'rium*); Baxter v. 367.

In great repute as a bitter, and sold in the herb-markets under the name of "Sanctuary," which word appears to be a corruption of "Centaury," the name, properly, of a genus of Compositæ. Like the Chlora, of the company of which it is fond, this beautiful plant expands its corollas only in sunshine, and is equally distinguished among our wild-flowers by the pure colour of its petals.

In addition to the normal or inland form, there grow by the sea, especially at Southport, Lancashire, and thereabouts, varieties with narrower and broader leaves, and of stature more or less diminutive, called by those who esteem them species, *Erythræ'a littora'lis*, (E. B. xxxiii. 2305.) *Erythræ'a latifo'lia*, (E. B. Supp. ii. 2719.) and *Erythræ'a pulchel'la* (E. B. vii. 458.) Sometimes the stem is barely an inch high, and the cyme is reduced to a solitary flower, but of so dark a rose-colour as to show at a long distance.

The Gentians are often quite as much reduced in size, as represented in Fig. 131, and even the Chlora is not infrequently, on the sandhills, only 3—4 inches high, and one-flowered.

8. Common Cicendia—*Cicen'dia filifor'mis.*

Sandy heaths, and especially upon the margins of pools and boggy hollows. Devonshire. Dorsetshire. The New Forest. Near the Land's End. Sussex. Not found in Scotland. Fl. July. Annual.

Curtis, iii. 453; E. B. iv. 235; Baxter, v. 400 (all as *Ex'acum filifor'me.)*

9. Dwarf Cicendia—*Cicen'dia pusil'la.*

Moist and sandy places in Guernsey. Fl. summer. Annual.

10. Bog-bean—*Menyan'thes trifolia'ta.*

Boggy ground, swamps, and by pondsides; common all over Britain. Fl. May—July.

Curtis, ii. 234; E. B. vi. 495; Baxter, iv. 245.

The *Menyan'thes* is one of the most beautiful plants this country can boast, and justly deserves its title of the hyacinth of the marshes. The delicate rose-hue of the flowers, and the shaggy white beards upon their petals, at once distinguish it from every other aquatic and amphibious native.

11. Villarsia—*Villar'sia Nymphæoi'des.*

Lakes, slow rivers, canals, and ornamental waters; not uncommon in England and Ireland, but principally in the midland and southern counties. Doubtfully indigenous, and in many cases certainly introduced. Abundant in many parts of the Thames and Isis, and occasionally in their tributary creeks. Fl. summer.

Curtis, iv. 591; E. B. iv. 217 *(as Menyan'thes Nymphæoi'des);* Baxter, iii. 161.

Growing readily when planted in ponds and reservoirs, this beautiful plant too often becomes, unfortunately, a troublesome weed, and is then dragged out and exterminated. Hence its sudden disappearance in regard to special localities.

The cultivated Gentianaceæ comprise many flowers of the greatest beauty, and remarkable in many instances, for their vivid colour. The commonest is the well-known gentianella or *Gentia'na acau'lis,* the incomparable deep-blue vases of which are over two inches in depth, and have five green-dotted stripes down the inside. Lifted scarcely above the level of the ground, they contrast superbly with the crimson anemones and white narcissus of April and May, and when the plant is used for an edging, produce an effect of unequalled richness. *Gentia'na Sapona'ria* (Bot. Mag. xxvi. 1039.*)* grows one or two feet high, and is remarkable for its heads of large barrel-shaped corollas, closed at the mouth. Those of *Gentia'na septem'fida* (xxx. 1229.) are greenish-brown externally, and very apt to increase their lobes to six or seven. *Gentia'na asclepiade'a* (xxvii. 1078.) has broad, amplexicaulent leaves, and long and narrow corollas; *Gentia'na crini'ta,* (xlvi. 2039.) the tetramerous *G. cilia'ta* (xvii. 639.) and several others, are equally distinguished for the intensity of their blue, and frequently for their exquisite fimbriation. *Gentia'na lu'tea,* a tall-growing species with yellow flowers, supplies the gentian-root of pharmacy. *G. visco'sa* (Bot. Mag. xlvii. 2135.) is also yellow-flowered; *G. incarna'ta* (xliii. 1856.) has terminal clusters of light rose-coloured blossoms. Some of the lovely little gentians of the Alps, the high pastures of which are strewed with their living *lapis-lazuli*, are cultivated in collections of Swiss plants, and are remarkable for the great size of the corolla, in connection with miniature stems and leaves.

Greenhouse species of *Chiro'nia* from the Cape of Good Hope, have long been great favourites. Nearly all have pink flowers, often nearly an inch across, pentamerous, and in general character resembling those of the Blushwort, only that the petals are not so acute, and are sometimes rounded. The anthers, as in the Blushwort, are long and cylindrical, and twist themselves in a spiral scrolls after casting their pollen. One of the most beautiful is the *Chiro'nia decussa'ta* (Bot. Mag. xix. 707.) Similar in habit, but with tetramerous flowers, is the very pretty *Ophe'lia corymbo'sa* from Nepal (lxxv. 4489.) The square-stemmed *Ex'acums* are remarkable for their fine blue-purple flowers, as in *Ex'acum bi'color* and *Ex'acum Zeylan'icum*, (lxxi. 4202, lxxiv. 4423.) the former with tetramerous, the latter with pentamerous, flowers. *Lisian'thus Russellia'nus* (lxv. 3626.) has blossoms of similar hue, but richer, and with a deep centre, and nearly two inches across, while the foliage is like that of the Chlora. *Sebæ'as* are distinguished by the inflated calyx, and the same is the case with the superb *Prepu'sa Hookeria'na* from the Organ Mountains (lxviii. 3909.) This last is a truly wonderful plant. The leaves are narrow and somewhat tufted: the flower-stems are light-red, and support a panicle of four or five blossoms, which differ from all ordinary Gentianaceæ in having their parts in *sixes*. The calyx is scarlet, the size of a large acorn, greatly inflated, and with six prominent angles; the corolla is white, and protrudes but slightly. Of the remainder, none perhaps excel the *Sabba'tias*. These are elegant North American plants resembling *Chiro'nias*, as in *S. calyco'sa*, (Bot. Mag. xxxix. 1600.) and the strikingly beautiful *Sabba'tia campes'tris*, a tender annual from Texas, with rose and yellow flowers. After blooming, the anthers become revolute. *Eus'toma silenefo'lia* is a pretty annual with white flowers, from the Isle of Providence. *Villar'sias* from New Holland and the Cape of Good Hope, are sometimes seen intermixed with exotic water-lilies, as *Villar'sia sarmento'sa*, (Bot. Mag. xxxii. 1323.) and *Villar'sia exalta'ta*, (xxvi. 1029.) the flowers of which grow in cymes of 12—14.

LXXXVI. THE NUX-VOMICA FAMILY.—*Logania'ceæ.*

The 160 or 170 species of plants which share in the general structure of the Nux-vomica tree, correspond with it also in their very generally active and deleterious properties. Perhaps no family of similar extent includes so many that are poisonous. Fortunately they are almost all either tropical, or natives of countries much warmer than our own, a few Australian and North American species being the only exceptions, so that British gardens hold scarcely a representative. *Spige'lia Marilan'dica*, the long-celebrated "Carolina Pink-root," (Bot. Mag. iii. 80.) has large and beautiful red flowers which expand at the mouth into five yellow rays, and grow in loose terminal racemes. The leaves are opposite, ovate, and pointed. Although hardy, this plant is however so very difficult to preserve, as to be extremely rare, and perhaps not now in England. *Spige'lia Anthel'mia*, another celebrated vermifuge, of the West Indies, (Bot. Mag. l. 2359.) is a tender annual. *Loga'nias* are small bushes with clusters of white flowers, natives of New South Wales. *Fagræ'a obova'ta* (lxxi. 4205.) is a fine East Indian tree. The characters which connect all these plants are much the same as those of the *Gentiana'ceæ*, with the addition of another found in the very general presence of stipules that are frequently interpetiolar. Were the ovary inferior, they would very closely approach the *Cinchona'ceæ*.

Nux-vomica is the produce of an Indian species of *Strych'nos*, a tree with small greenish-white flowers, and beautiful orange-coloured and globular fruits, 2—3 inches in diameter, in which the seeds are embedded. These resemble flat gray buttons the size of a shilling; they are covered with fine down, and have a depression in the centre. *Strych'nos multiflo'ra* probably furnishes the seeds called "Ignatia," or "St. Ignatius' beans." *Strych'nos toxif'era* supplies the basis of the famous Wourali-poison of Guiana.

LXXXVII. THE LILAC FAMILY.—*Olea'ceæ.*

Trees and shrubs, the branches usually dichotomous, and ending abruptly in large and conspicuous buds. Leaves opposite, either simple and undivided, and more or less oval or lanceolate, and pointed; or *quasi*-pinnate, with few or many pairs of leaflets. That they are not really compound is shown in late summer by young leaves of the Ash, which have the upper lobes decurrent upon the petiole. Inflorescence in terminal or axillary racemes or panicles, the branches and pedicels opposite. Flowers tetramerous, small, but from their abundance gay, and often highly scented. Stamens usually two, sometimes three or four, usually concealed in the corolla, the lower part of which is tubular, and to the inner surface of which they adhere. Ovary solitary; fruit various, usually either a berry or a capsule. In the ash-tree the perianth is undeveloped, a circumstance which at the first glance makes it seem quite out of place in a family which in every other instance is possessed of one. Under an artificial system of classification, so wide a difference would remove it elsewhere, and thus to a distance from its real congeners; but in the Natural System all *single* characters are subordinate to the *mass of characters*, and here we see the great excellence and superiority of this system. The ash-tree agrees with the lilac, the olive, the privet, and every other member of the family, in all particulars except perianth, and the absence of this part reckons as a mere exception to the general rule, that the family they compose has the customary floral coverings. Some species are prone to be in part unisexual. The flowers are sometimes only two together.

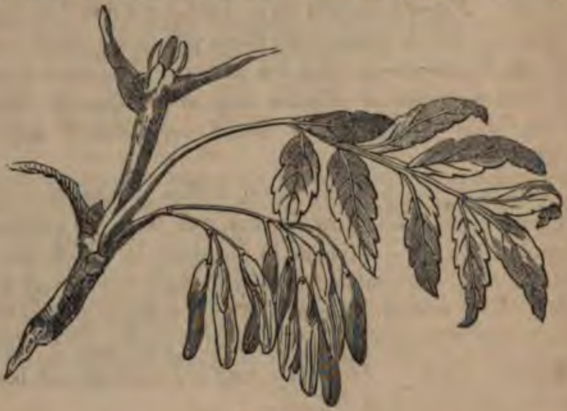

Fig. 133.
Leaf and Fruit of Ash-tree.

The Oleaceæ are natives chiefly of temperate latitudes, inclining towards the tropics, and number between one and two hundred species. Many useful plants occur among them. Timber is supplied by the ash-tree; olives and olive oil are yielded by the *O'lea sati'va;* manna is the produce of different species of *Or'nus* and *Frax'inus.*

Two species grow wild in Britain.

1. A tall and extremely graceful tree, glabrous in every part, with smooth gray bark, and pinnate leaves, 8—12 inches long, and composed of 4—6 pairs of lanceolate and serrated leaflets, and an odd one at the end. Flowers in loose and rather drooping panicles, of a dark blackish-green colour, and appearing before the foliage, near the extremities of the previous year's twigs. Perianth absent; stamens two, the anthers large, oval, and reddish-purple. Ovary solitary and attenuated. Fruit in large, loose, pendulous panicles; the carpels thin, flat, oblong, about an inch in length, light brown when ripe, and with one or two seeds lying at the base. Individual trees are often unisexual. COMMON ASH-TREE.
2. A glabrous shrub, 3—6—10 feet high; the leaves lanceolate, entire, pointed, dull green, sometimes variegated, occasionally in whorls of three, and often remaining over the winter. Flowers in pyramidal clusters of an inch or two in length; white, soon turning to reddish brown, and sweet-scented. Stamens 2—3. Fruit a globular and shining black berry, rather smaller than a pea, nauseous and bitter, and often persistent through the winter. COMMON PRIVET.

HABITATS AND DISTRIBUTION.

1. Common Ash-tree—*Frax'inus excel'sior.*

Woods, plantations, and hedgerows; everywhere. Fl. March, April.

E. B. xxiv. 1692; Baxter, v. 382.

Though it loves the neighbourhood of streams, the ash is not infrequently found growing upon the summits of ancient and ruined walls and towers, such as those of castles and monasteries, to which its winged seeds are conveyed by the wind, like those of the sycamore, another tree often found on the topmost stonework of dismantled buildings. When without leaves, it is immediately distinguished by its short, blunt, egg-shaped, and sooty-black buds, the twigs supporting which are usually flattened and channelled towards the extremity. In old trees, the lower branches, after drooping, curve upwards at the end. Every young part is exceedingly brittle, snapping like a fresh-pulled radish, and presenting, in this respect, a remarkable contrast to the willow, which is as tough as a piece of wire. Few trees are bare of leaf for so long a part of their time, the ash being one of the late risers, seldom green all over until June, and losing its foliage with the first frost, which often brings down the whole at one fall. Hence we rarely behold in this beautiful tree those diversified tints which in most others make their appearance towards October. The only change the leaves appear to undergo is to curl up as if scorched. The clusters of dry brown fruits, or "ash-keys," remain on the upper branches until spring, and are highly characteristic.

Many varieties are found in pleasure-grounds and arboretums. The most curious is one with egg-shaped and undivided leaves 4—5 inches long, called by nurserymen *Frax'inus simplicifo'lia;* the most beautiful is the "weeping ash" or *Frax'inus pen'dula*, so charming an ornament for a lawn. When tall and symmetrical, the branches form a perfect vegetable tent. A sub-variety of this has the leaves variegated. When the ash is in perfect leaf, greenhouse plants may safely be put out; as soon as the leaves begin to fall, it is a sign that the time is come for them to be taken in. Simple incidents connected with plants often thus identify themselves with changes of the seasons, and become monitors for us. No indications of the best periods for performing the various operations of horticulture and of farming are so truthful as those furnished by the external phenomena of the life of Trees.

2. Common Privet—*Ligus'trum vulga're.*

Hedges; common as far north as Forfarshire, but doubtfully wild except in the southern counties. Fl. early summer.

Curtis, ii. 293; E. B. ix. 764; Baxter, ii. 119.

The demure white flowers appear plentifully in June, and in favourable situations are followed by beautiful clusters of black berries. The latter remain upon the bushes till mid-winter, agreeably contrasting, in their jetty hue and fine polish, with the scarlet fruits of the bryony and the wild rose. The panicle of flowers is occasionally found with the branches so much lengthened as to give it a resemblance to the white variety of the Persian lilac, and the berries occasionally vary to yellow, and even to white. No shrub is commoner in the fences of gardens.

It would be difficult to name a more popular flower than the common garden representative of the *Olea'ceæ.* Everyone knows the Lilac-tree, and everyone desires it as the first ornament of the shrubbery. The native country of this beautiful plant is not, as often supposed, exclusively Persia, though the name *lilag*, signifying "flower," is a Persian one; it grows wild all along the rocky banks of the Danube, attaining the height of 20 feet. "Persian Lilac," emphatically so called, is a smaller species, with narrow leaves; it is well adapted for forcing, and remarkable, when so treated, for its want of odour, though when growing in the open garden, nearly as fragrant as the common tree-lilac. The latter is the *Syrin'ga vulga'ris*; Persian Lilac is the *Syrin'ga Per'sica.* White-flowered varieties of both species are very common, and of the Persian there is a variety with some of the leaves pinnatifid. *Syrin'ga Josikæ'a* (Bot. Mag. lx. 3278.) is distinguished by its wrinkled leaves, white underneath, and very much resembling those of the Balsam-poplar. The calyx, peduncles, and branches are covered with glandular pubescence; and the flowers, which come out later than those of the other lilacs, have a very long tube, and a very small limb to the corolla. The Olive-tree requires the greenhouse. This famous production of nature is aboriginal to western Asia, whence it appears to have spread, at a very early period, to the borders of the Mediterranean. The leaves are lanceolate, pointed, more or less gray or hoary underneath, and evergreen; the branches are numerous, and the whole aspect of the plant being glaucous, it is not very unlike the *Quer'cus I'lex.* The height is usually about 25 feet; the flowers, which are white, grow in axillary racemes. No tree of stature so inconsiderable is equally noted for its longevity. There are olive-trees at Terni which are believed to have existed since the days of Pliny, and it is said that those in the garden of Gethsemane are still alive. The wild form of the olive, called *O'lea Europæ'a*, is to the cultivated, or *O'lea sati'va*, what the crab is to the apple. *O'lea fra'grans*, (Bot. Mag. xxxviii. 1552.) a greenhouse shrub from China, is esteemed for the pleasant odour of its yellowish flowers. *Chionan'thus Virgin'ica*, or the "Fringe-tree," rises to the height of 10—30 feet, clothing itself every season with handsome foliage like that of a Magnolia, the lanceolate and glabrous leaves being often 12 inches long by 5 or 6 in width. The snow-white flowers are produced in panicled racemes; the segments of the corolla are long and linear, and in the month of June make the tree seem ornamented with copious masses of white fringe. Catesby, who gives so many excellent figures of the trees of North America, includes it in his "Carolina" (i. 68.) The "Manna-tree" (*Or'nus Europæ'a)* is a native of the South of Europe. The ordinary stature is 20—30 feet, but sometimes it grows to twice that height. The leaves resemble those of the Ash; the greenish-white flowers come out previously to them, growing in terminal panicles, and having corollas with long and narrow petals, and stamens with long filaments. Linnæus considered it a *Frax'inus*, calling it *Frax'inus Or'nus*, under which name it is still often known by gardeners. Whatever was the "manna" of the Hebrews in the desert, that of the *Or'nus* must in no wise be confounded with it. The former was suitable for food; the latter is only available as medicine. Several true species of *Frax'inus* occur in plantations, especially the American Ash, or *Frax'inus America'na*, known by its lighter-coloured bark, and the paler green of the leaves, which are also whitish underneath. The Green Ash, or *Frax'inus juglandifo'lia*, likewise from North America, is distinguished by the brilliant green of the young shoots, and by the leaves being of nearly the same colour upon both surfaces—a circumstance rarely observed in trees. *Phillyre'as* are invaluable shrubs, from the fact of their being evergreen, and growing slowly and regularly upon every side, so as to form, in a few years, dense round bushes of 8—15 feet in height. *P. me'dia* and *angustifo'lia* have linear-lanceolate leaves, nearly or quite entire; those of *P. latifo'lia* are oval and serrated. The little greenish-white and diandrous flowers grow in small axillary clusters, and appear in May and June. The species, of which there are many varieties, are natives of southern Europe and western Asia. The fruit is drupaceous, black and globular. Exotic *Ligus'trums* from China and Japan, appear occasionally, as *Ligus'trum Japon'icum* and the "Wax-tree" or *Ligus'trum lu'cidum*, (Bot. Mag. lii. 2565.) which rises 10—20 feet high, and in autumn is covered with white blossoms. *Forsyth'ia viridis'sima*, (lxxvi. 4587.) from the north of China, is a beautiful deep-green bush, remarkable in early spring for the multitude of large and prominent buds diffused over the preceding year's shoots, and which cover them, before the leaves appear, with bright yellow flowers almost as copiously as happens in the mezereon. The leaves, when mature, are oblong-lanceolate, and a little serrated towards the end; the branches are square; the flowers grow in couples, and the petals are long and narrow. *Fontane'sia phillyreoi'des* bears a close general resemblance to common privet, but is evergreen, and strikingly different in having a rough and exfoliating bark. The yellowish-white flowers grow in axillary racemes.

LXXXVIII. THE NIGHTSHADE FAMILY.—*Solana'ceæ.*

One of the large and important families of botanical nature, commending itself to our attention alike by the beauty of its flowers and fruits, and by the powerful and often deadly quality of its secretions. Leaves alternate, destitute of stipules, but sometimes accompanied by a smaller leaf at the base; simple and undivided, or lobed, or irregularly pinnatifid. Flowers mostly regular, usually pentamerous, and generally bell-shaped, or starlike, the petals plaited white in bud. Stamens inserted upon the corolla, and corresponding in number with its lobes, with which they are alternate. Ovary solitary, two-celled, or incompletely four-celled; style one; stigma simple. Fruit a berry; sometimes a capsule: in either case with many seeds. The calyx often remains until the fruit is ripe; and the peduncles sometimes spring from the internodes instead of the axils. Most of the species are herbaceous, or under-shrubby, but a few become soft-wooded trees. *Sola'nums* are often armed, both upon the stems and upon the leaves, with abundance of long sharp thorns that are often of a shining red colour. The capsules and withered calyces often yield very beautiful skeletons, which may be obtained either by maceration, or by keeping on the alert for them during October and November.

Linnæus called these plants "Luridæ," from their frequently suspicious smell and appearance, which he regarded as indicative of the narcotics and terrible poisons so abundantly diffused among their species. Stramonium, *Hyoscy'amus*, tobacco, belladonna, nightshade, meet here in deadly compact, with a long train of plants which, if not absolutely noxious, are most potent in their action upon the human frame. Hence the value of the family in medicine, which derives from the Solanaceæ some of its most energetic drugs. With the poisons are mingled, however, productions fit for food. The potato (though the extract from its leaves is a strong narcotic, ranking between belladonna and Conium) is inestimable in its farinaceous tubers; the tomato or love-apple, the fruits of the egg-plant, and of several others, are, when cooked, not only harmless but agreeable; pungency is at its maximum in Cayenne-pepper, prepared from the fruits of the capsicum, which are also the principal element of "hot pickles." The family is distributed all over the world, excepting the extremely cold parts, but is chiefly seated in the tropics.

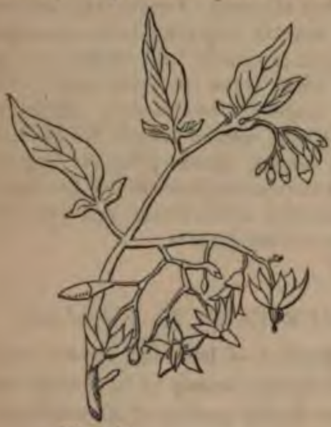

Fig. 134.
Bitter-sweet Nightshade.

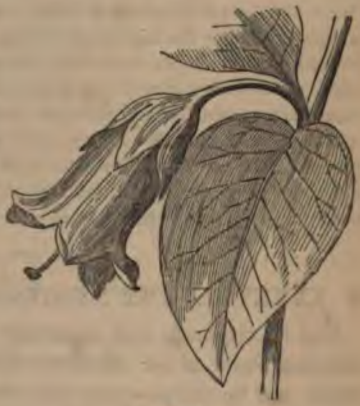

Fig. 135.
Deadly-nightshade (*At'ropa Belladon'na.*)

Five species are accounted wild in Britain, but one of them is indubitably of foreign origin. A sixth is in course of naturalisation, and is here allowed the place accorded to colonists.

A. Corolla 3—4 inches long, trumpet-shaped, tubular, white, flushed with yellow. Stamens standing apart from one another. Leaves ovate and angular. Fruit a thorny capsule, the size of a walnut, opening into four pieces, and containing a large central placenta. Seeds black. Stem branched, 2—3 feet high. 1. Thorn-apple.

B. Anthers of the five stamens forming a yellow cone, which occupies the centre of the blossom. Corolla flat and starlike, usually violet-coloured or white, the segments often a little reflexed. Inflorescence in lateral corymbs. Fruit a small coloured berry.

A scrambling, under-shrubby plant, the stems often 5—8 feet long. Leaves 1—3 inches long, oval and pointed, and many of them with two large lobes at the base. Flowers violet-blue, with two green spots at the base of every segment; occasionally white or pink. Berries ovoid, about the size of currants, crimson and semi-translucent when ripe, and hanging in elegant clusters, which often remain after the leaves are withered. (Fig. 134.)
2. BITTER-SWEET NIGHTSHADE.

Stem herbaceous, 12—24 inches high. Leaves ovate. Flowers white. Berries globular, black, occasionally green.
3. BLACK-FRUITED NIGHTSHADE.

C. Corolla nearly an inch long, tubular-bell-shaped, and of a dull brownish-purple colour. Root perennial. Stems annual, three feet high, branched and leafy. Leaves ovate, acute, glabrous and entire. Flowers solitary, axillary, and pendulous. Fruit a shining and violet-black berry, globular and the size of a grape. (Fig. 135.) 4. DEADLY-NIGHTSHADE.

D. Corolla about an inch broad, yellowish, dark in the centre, and usually laced with purple. Stems branchy, 1—3 feet high. Whole plant clammy, and with a strong and disagreeable odour. Flowers in a dense terminal cluster, which is curved while in bud, and only two or three opening at once. Calyx persistent, much longer than the capsule when the latter has become ripe. By this time the capsules form a spike 6—20 inches long; they extend along the stalk in two vertical rows, and are all turned to one side, with leaves more or less copiously interspersed. The convex top of the capsule comes off like the lid of a box, and gives egress to the very numerous seeds, which resemble those of the poppy. 5. HENBANE.

E. A rambling shrub, with long slender shoots, growing rapidly, and capable of becoming 30—40 feet high. Suckers from the base innumerable. Leaves lanceolate, acute, and glabrous. Flowers starlike, axillary, and purplish. Fruit an ovoid red berry, not unlike that of the Bitter-sweet Nightshade.
6. WILLOW-LEAVED LYCIUM.

HABITATS AND DISTRIBUTION.

1. THORN-APPLE—*Datu'ra Stramo'nium.*

A native of the East Indies, now extensively naturalised in Europe, owing, it is believed, to the Gipsies, who used the seeds medicinally, and carried it wherever they wandered. By reason of its beauty, both as to flowers and large prickly capsules, it is also a frequent inmate of the garden. From one source or another, it is frequently found in waste places, among vegetable rubbish, in potato-fields, on heaps of manure by the wayside, &c., but seldom in the same spot for more than one season. Fl. July. Annual.

Curtis, ii. 381; E. B. xviii. 1288; Baxter, ii. 121.

2. Bitter-sweet Nightshade—*Sola'num Dulc-ama'ra.*

Moist hedges, and among the tangled masses of summer vegetation on the borders of ponds and ditches; common, except in Scotland. Fl. June—August. Berries ripe in September.

Curtis, i. 14; E. B. viii. 565; Baxter, ii. 110.

Few plants that grow in our hedges adorn them more beautifully than the bitter-sweet nightshade, whether regarded as to its violet-coloured and starlike flowers, or the delicate translucent crimson of its ripened berries, which hang till shrivelled by the frost, and long after the leaves are gone. Unhappily, it is deleterious. The leaves are strongly narcotic, and the berries, though it does not appear that they are inevitably poisonous, certainly most dangerous. It is very commonly thought to be the *deadly*-nightshade, or *At'ropa Belladon'na;* but no two plants are more distinct. The Belladonna has solitary and bell-shaped flowers instead of clustered and starlike ones, and the fruit, instead of being red, resembles a small black cherry. A garden variety of the *Dulc-ama'ra* has the flowers double.

3. Black-fruited Nightshade—*Sola'num ni'grum.*

Waste and cultivated ground; common, except in Scotland, where it is probably not even indigenous. Fl. June—August. Annual; sometimes perennial.

Curtis, i. 86; E. B. viii. 566.

The narcotic qualities of this species are considerably more active than those of the *Dulc-ama'ra*, but the berries are fortunately so little tempting in appearance, that they are not likely to be tasted even by children.

4. Deadly-nightshade—*At'ropa Belladon'na.*

Waste, stony, and shady places, most usually among ruins; rare, and perhaps truly wild only in the south of England. Furness Abbey, Lancashire; probably a heir-loom. Boxhill, Surrey. Radbury Hill, near Stroud. Fl. June, July.

Curtis, ii. 308; E. B. ix. 592; Baxter, i. 10.

The traitorous quality of the berries is proverbial. A lady-friend of the author, when a girl at school in Germany, had her life saved after eating some, only by being enveloped in mustard-poultice for 24 hours. A countryman had warned her, as he thought, by calling out "*Schöne Frau! Schöne Frau!*" the German name of the plant, and equivalent of *Bella-donna*, but the words were regarded as a rustic compliment, and the intention not discovered till too late.

5. Henbane—*Hyoscy'amus ni'ger.*

Waste ground, hedgebanks, upon rubbish, and by waysides, especially in dry and calcareous soil, and near the sea; not uncommon. Fl. June. Annual and biennial. Capsules in October.

E. B. ix. 591; Baxter, v. 321.

The petals are occasionally destitute of the very elegant lace-work of coloured veins by which this plant is marked.

6. Willow-leaved Lycium—*Ly'cium Bar'barum.*

A shrub long since introduced from southern Europe, now very common in gardens, and against house-fronts, especially suburban ones, and often called by the improper name of "tea-tree." From cultivation it has slipped into the country, mingling in several places, with the aborigines in the hedges. Fl. May—July.

Though the plants of this family are apt to be weedy, and few can be considered ornamental in their foliage, they are very often opulent in beauty of flowers. Many *Sola'nums* are cultivated on this account—all known immediately by their starlike corollas, and the cone of yellow anthers in the centre. *Sola'num jasminoi'des* scrambles, in greenhouses, to the height of 10—12 feet, and produces great bunches of pure white flowers, with divaricated peduncles like those of the common Bitter-sweet; *Sola'num Balbis'ii* and its varieties (Bot. Mag. lv. 2828.) have the stems and leaves clothed with strong prickles, the blossoms reminding us of the potato-flower; *Sola'num angula'tum*, from Lima, has large angular and thorny leaves, with purple veins and petioles, and if planted out for the summer, makes a splendid appearance in the flower-borders; *Sola'num pseudo-Cap'sicum* and *Sola'num Capsicas'trum* are covered in winter with pretty orange-coloured or scarlet fruits, nearly the size of a cherry, and perfectly globular. The fruits indeed of many genera of this family, *Sola'num* included, are fully as ornamental as the flowers, and not seldom much more so. Foremost among them are the great ovoid and pendulous berries of the "egg-plant" or *Melonge'na*, so named from their close resemblance to the egg of the domestic fowl. There are varieties of the egg-plant with yellow, with purple, and with scarlet fruit, and an eatable one is well known as the "aubergine." The large red, yellow, white or green fruits of the Love-apple or *Lycoper'sicum* are equally familiar, at least in the kitchen-garden, where the plant is generally trained against a wall, like a little peach-tree. Capsicums in all their varieties, Chilies, Bird-pepper, Cherry-pepper, &c., are also to be regarded as ornamental in regard to their fruits, though grown principally for their value as burning condiments. *Physa'lis edu'lis* and *Peruvia'na* (Bot. Mag. xxvii. 1068.) furnish berries fit for tarts, the odour being that of apples, and the taste sweet yet agreeably acidulated. The former plant is commonly known as the "Cape-gooseberry." It grows 2—3 feet high, and is pubescent in every part. The leaves are cordate; the flowers solitary and axillary, pale-yellow, with five dark spots in the centre, like those of a Cistus; the calyx, as the fruit ripens, becomes very large, inflated, and of a dull yellowish colour. The inflated and richly-coloured calyx of the *Physa'lis Alkeken'gi* might be mistaken for fruit, and has procured for this beautiful denizen of the earliest English gardens, the still-current name of "winter-cherry." While the plant is in bloom the sepals are small and green; by October they increase in size so much as to form a pyramidal cage for the berry within, and assume a fine and permanent scarlet hue.

Of Solanaceæ cultivated exclusively for their flowers, and not belonging to the typical genus, there are many very showy and very dissimilar forms. *Petu'nias* take the first place, especially when *quasi*-double and with the petals striped, as in the varieties of *P. viola'cea*, a native of Buenos Ayres. *Datu'ras* are remarkable for the prodigious size of their corollas, which are often six inches long, and generally white or purple, or with a mixture of these colours, as in *D. fastuo'sa*, which is dark on the outside, and satiny white within. *Datu'ra Me'tel* (Bot. Mag. xxxv. 1440.) is wholly white; *Datu'ra Tat'ula* blue; *Datu'ra ceratocau'lon* (Bot. Mag. lxi. 3352.) a fine species from Cuba, is white with just a tinge of purple; *Datu'ra chloran'tha* is yellow and fragrant—a circumstance in this family very unusual. Like the *Petu'nia*, these splendid flowers often appear to be "double," but in reality they are no more than "hose-in-hose," *i.e.*, a second corolla is developed, interior to the normal one, the stamens and pistil remaining perfect. *Brugman'sias* are not inferior to them. *B. suave'olens* (by gardeners often called *Datu'ra arbo'rea*) has a tubular calyx, four inches long, from which a great convolvulus-like corolla is protruded, white within, pale yellow outside, and exhaling a powerful odour. *Solan'dras* keep equal pace; with yellow flowers, as in the *S. grandiflo'ra*, (Bot. Mag. xliv. 1874.) and with green ones, as in the *viridiflo'ra* (xlv. 1948.) In *Solan'dra gutta'ta* the edges of the petals are most beautifully crisped. Tobacco (*Nicotia'na Taba'cum*) is a frequent object of culture. This celebrated plant is distinguishable from all other Solanaceæ by its elliptical leaves and upright fascicles of rather small pink flowers. Another species, the *N. rus'tica*, has green blossoms, and in the *N. noctiflo'ra* (liv. 2785.) they are purple and white. Several others of this genus are also grown for ornament. *Ces'trums* have clusters of tubular flowers, about an inch in length, and with the five little lobes reflexed. *C. auranti'acum*, or the "orange-coloured," is both common and pretty. *Habrotham'nus*, in its different species, is also very ornamental in the greenhouse, hanging out masses of funnel-shaped flowers somewhat like those of the Cestrums. *H. fascicula'ris* (lxxi. 4183.) is a fine climber with blossoms of a crimson puce-colour. *Nierember'gias* are pleasing little plants for pots and flower-borders. *Scopo'lia Carnio'lica* (Bot. Mag. xxviii. 1126.) is a valuable spring-flower. The famous "mandrake" of the middle ages is the *Mandrag'ora vernal'is*, a rare plant with the habit of a primrose, and white blossoms. *Ramon'da Pyrena'ica* (Bot. Mag. vii. 236) is a remarkably pretty alpine with purple flowers. *Nican'dra physaloi'des* (li. 2458.) is a blue-flowered annual with inflated and persistent calyx. Henbanes, in a few species, shrubby Lyciums, and the universal potato, or *Sola'num tubero'sum*, nearly complete the list.

LXXXIX. THE CONVOLVULUS FAMILY.—*Convolvula'ceæ.*

With the exception of a few erect bushes, these are all elegant herbaceous plants, generally either training or twining, in which latter case their slender string-like stems often reach many yards in length. Leaves alternate, simple, usually undivided, and then often beautifully heart-shaped; occasionally fan-lobed or pinnatifid; always without stipules, and generally upon long petioles. Flowers either terminal or axillary; solitary or in little clusters; the corolla usually large, regular, formed of five petals united into an exquisite bell, in shape like the mouth of a trumpet, and plaited or spirally twisted before expansion;

in colour white, pink, azure, crimson, or purple, and sometimes richly striped at the line of junction of the component petals. Calyx of five sepals, which are remarkably imbricated, and often very unequal.—Stamens five, on long filaments, inserted in the base of the corolla. Ovary solitary; style very long; stigma 2-lobed. Fruit a 1—4-celled membranous capsule, with extremely thin partitions, and containing but few seeds, which are large, and with leafy and doubled-up cotyledons.

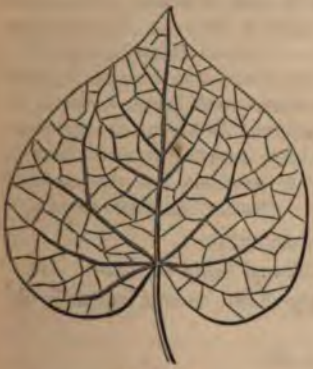

Fig. 136.
Leaf of Convolvulus major.

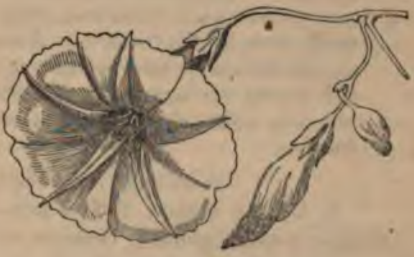

Fig. 137.
Flower of Convolvulus.

Few flowers are more transient than those of the Convolvulaceæ. They often open at daybreak or earlier, attain perfection by sunrise, and wither before noon, unless the sky be overcast. Hence they have received the name of "morning-glories." The pollen is often spherical, and covered with spinous points, like that of the mallow.

The Convolvulaceæ are abundant in all parts of the tropics, but rare in colder regions, and at the extreme north are entirely unknown. The number of species is between six and seven hundred. The roots abound for the most part with an acrid milky juice, containing a peculiar resin, the action of which is strongly purgative, as instanced in scammony and jalap. In a few kinds the purgative resin is hardly present, and then the large tubers are often remarkable for their sweet and starchy contents, as in the common "sweet-potato" or "batatas," so important an article of food in tropical countries. Very many are annuals; others, although their flowers possess great beauty, are rendered obnoxious weeds by the length and strength of their creeping roots.

Three species grow wild in Britain.

1. Stem twining to the length of many feet over hedges and bushes. Leaves arrow-shaped, the lobes at the base abrupt, as if the points had been cut off; flowers solitary and axillary, on square peduncles, with a pair of large heart-shaped and leaf-like bracts immediately beneath the calyx; corolla pure white, sometimes tinged with pink, 2—2½ inches across at the rim. GREAT HEDGE BINDWEED.
2. Stems rarely more than two feet long, trailing upon the ground, or, if support be at hand, slightly climbing. Leaves ovate-arrow-shaped, the lobes at the base pointed; flowers axillary, usually in pairs, with two or three small bracts at a distance from the calyx; corolla pink, or pinkish-white, often with darker plaits, an inch or a little more in diameter, fragrant, very pretty, and opening only in sunshine. SMALL FIELD BINDWEED.
3. Stems procumbent, 1—2 feet long, often almost buried in the sand. Leaves small, thick, broadly rounded or kidney-shaped, with broad, rounded, or angular lobes at the base, and on long petioles. Peduncles one-flowered, and bearing two large bracts. Corolla large, purplish or rose-coloured, with pale yellow plaits, expanding only in sunshine, and of very brief duration. PURPLE SEA CONVOLVULUS.

HABITATS AND DISTRIBUTION.

1. GREAT HEDGE BINDWEED—*Convol'vulus se'pium.*

Hedges in moist ground; common everywhere, except in Scotland, where it is local. Fl. July—October.

Curtis, i. 13; E. B. v. 313.

In the wild convolvulus we have another example of great beauty of form combined with habits that make the plant a pernicious weed. The flowers are of the chastest white, and among the largest and handsomest of our native Flora; but when once the plant has established itself in a hedge, or among bushes in a garden, every year it twines its strangling roots and stems closer and closer, the mass of foliage becoming so dense as quite to conceal what is underneath, and by degrees to smother and destroy it. To eradicate the plant is almost impossible, without at the same time uprooting its victim. The large white bells, as they hang upon the hedges in dewy autumn mornings, are strikingly beautiful. The reader of Virgil will remember them as the shepherd's "*alba ligustra*;" and no doubt it was to the same plant that Galatea was compared by Acis—

> Candidior nivei folio, Galatea, ligustri,
> Floridior pratis!

"Fairer art thou than the petals of snowy Bindweed; gayer than the flowery meads!"—OVID. *Met.* xiii. 789.

A variety occurs sometimes in which the corolla is tinged or striped with rose-colour, and another exists with the flowers double. The former is figured in Bot. Mag. xix. 732.

2. SMALL FIELD BINDWEED—*Convol'vulus arven'sis.*

Dry waysides, among short grass, upon railway-slopes, and in dry fields; sometimes clambering into the hedges, and found even upon heaps of stones by roadsides; very common, except in Scotland, where like the preceding, it is local. Fl. June—August.

Curtis, i. 85; E. B. v. 312.

An extremely gay and lively little plant, on fine sunny days often covering large surfaces with its open bells, and imparting an air of hilarity to the driest and most uninteresting places.

3. Purple Sea Convolvulus—*Convol'vulus Soldanel'la.*

Sand and sandhills upon the sea-coast, often half-lost among their speary grasses; common as far as the south of Scotland. West coast of Arran, plentiful. Between Penzance and Marazion, in the greatest abundance. Fl. June—August.

E. B. v. 314.

The hardy garden Convolvulaceæ are almost limited to those two popular and lovely flowers, the "Convolvulus major" and the "Convolvulus minor." The former, botanically *Pharbi'tis purpu'rea*, is a native probably of tropical America, and the most beautiful hardy twiner in cultivation. Its magnificent bells present every possible shade of crimson and purple, the latter unequalled in depth and richness, and sometimes vary to pure white. Like many other tropical annuals, they delay their appearance till the close of summer, and almost exhaust the sower's patience, but then make amends in their profusion. Opening by daybreak, or even earlier, the flowers last only till the sun is in the mid-heavens; but every morning there comes out a renewed supply, and so it continues, in lenient seasons, till beyond October, by which time the plant is hung all over with clusters of capsules, as fecund in its age as in middle life it was superb. The leaf is of the most elegant and symmetrical heart-shape in nature. (Fig. 136.) The "Convolvulus minor," botanically *C. tri'color*, is a native of the south of Europe, and takes its name from the threefold mixture of colours in the corolla, which is white at the base, yellow in the middle, and azure at the upper or expanded part. The fecundity of this species is equal to that of the "major." The stems grow upright, and manifest not the slightest tendency to twine; the leaves are oblong and sessile; and the flowers are sometimes quite white. *Convol'vulus* or *Calyste'gia pubes'cens* (Bot. Reg. N. S. ix. 42.) has double flowers of a light rose-colour, but does not seem likely to come into general cultivation.

In hothouses and conservatories (for pillars and trellis-work in which these plants are inestimable) there is nothing more superb than a well-grown *Pharbi'tis Lear'ii.* (Bot. Mag. lxviii. 3928.) A plant in a conservatory at Whalley Range, near Manchester, produced, in 1861, two or three hundred fresh blossoms every morning continuously for a space of time sufficient to give a total of 35,000 before Christmas, commencing in the middle of July, and during that period put forth shoots and runners to the length, in all, of fully two miles. The flowers of this marvellous plant are of a brilliant reddish-purple colour, and three inches in diameter at the margin. Other beautiful indoor species are the sky-blue *Ipomœ'a Nil* and *Ipomœ'a rubro-cœru'lea*, (Bot. Mag. vi. 188, lxi. 3297.) and the crimson *Ipomœ'a Horsfal'lii* (lxi. 3315.) The leaves of the former are cordate, the peduncles 2—3 flowered, and the corollas often fully four inches across; the *Horsfal'lii* has quinate leaves, and panicles of sometimes not less than 40 flowers, which appear in the depth of winter. The exterior of the corolla and the dark-hued and close-fitting calyx shine as if they had been varnished. *Ipomœ'a limba'ta* has violet-blue flowers with white margins. *Argyrei'a* or *Lettso'mia splen'dens* (Bot. Mag. liii. 2628.) is valuable alike for its crimson flowers and the beautiful silvery silkiness of its large ovate leaves. The scarlet-flowered *Quamo'clit vulga'ris* (Bot. Mag. vii. 244.) is one of the species remarkable for pectinate leaves. *Shute'ria bi'color* from the East Indies, the blue *Jacquemon'tia pentan'tha*, (Bot. Mag. xlvii. 2151.) different species of *Dine'tus* and *Pora'na*, and many others of the genera that have been named, illustrate the magnificence, albeit so fleeting, of this favoured race.

The Jalap-plant, it should be added, is not, as often supposed, the *Convol'vulus Jala'pa*, (Bot. Mag. xxxviii. 1572.) which is worthy of esteem only for its flowers, but *Exogo'nium pur'ga*. (Bot. Reg. N. S. x. 49.) It is further interesting to observe that the convolvulaceous structure and foliage are most curiously combined with the incurved inflorescence of the Borage Family, in a Mexican plant called *Mi'na loba'ta*. (Bot. Reg. N. S. v. 24.)

XC. THE WAX-FLOWER FAMILY.—*Asclepiada'ceæ.*

A large and very singular family of plants, consisting partly of leafless succulents of the Cactus type, and partly of slender and twining evergreen shrubs. They are nearly always milky-juiced; the leaves, when present, are entire and usually opposite, and the flowers, in the shrubby species, mostly umbellate, the umbels arising from between the petioles. The sepals, petals, and stamens are five each, and nowhere in nature is the blossom more markedly, and, for the chief part, more elegantly pentamerous. The especial character of the family is the agglutination of the anthers with the stigma. These parts are not merely in close contact, but actually consolidated into a single body, the centre of which is occupied by the broad and disk-like stigma, the grains of pollen cohering in the shape of waxy bodies, attached finally to the five corners of the stigma, and adhering to it by the intervention of peculiar glands. The ovaries grow in couples, and ripen into follicles, with numerous seeds, which are almost always crested with long white hairs.

The principal part of the succulent species belong to the southernmost part of Africa, where they cover the plains and other dry and sterile places with their eccentric shapes. The family abounds also in tropical India and New Holland, and in the equinoctial parts of America, a few herbaceous representatives alone appearing in Europe. Poisonous species occur very frequently among them, but a few kinds are esculent, and many are of the highest beauty in regard to their flowers. In some respects the latter resemble the flowers of Nightshades, and more particularly those of the *Apocyna'ceæ*, from which family the present is technically distinguished only by the peculiarity of the reproductive organs; the habit, the properties, and the geographical distribution being much the same in both.

Being altogether foreign, and mostly tropical, the family is little known in British gardens, though numerous species celebrated either for their oddity or for their extreme beauty, are tolerably common in conservatories. The "Wax-flowers" are almost universal, especially the old-fashioned *Hoy'a carno'sa*, a plant with semi-twining stems 6—8 feet in length; oval, pointed, and leathery leaves 2—3 inches long; and profusion of drooping and sessile umbels of whitish-pink and furry-petaled flowers, each with a hard and shining star in the centre, moulded, to appearance, out of the finest porcelain, and a gem of translucent honey depending from it like a drop of dew. The unopened buds of the Hoya, thick, flat, and glossy, present the most accurate pentagons in floral nature. *Hoy'a bel'la* and *Hoy'a Paxto'ni* are also great favourites. The umbels of the former contain exactly seven flowers, and droop in such a way as to exhibit only their snow-white under-surfaces. *Cyrtoce'ras reflex'a* (Bot. Mag. lxxv. 4518.) has large pendulous umbels of yellowish flowers with linear petals, which, as well as the long rays of the central star, bend backwards like the points of a 5-barbed arrow. *Stephano'tis floribun'da*, the Madagascar Chaplet-flower, (lxx. 4058.) has large umbels of white and long-tubed flowers, the odour of which wafts out when the hot-house door is opened. Various species of *Gomphocar'pus* and *Ascle'pias*, with lanceolate leaves, and umbels of long-pedicelled white flowers; the *Dictyan'thus campanula'tus* from Brazil; the fragrant *Pergula'ria* of the East Indies; (Bot. Mag. xx. 755.) the wax-fountain, or *Cerope'gia*, in many species, from the same country; and the *Schuber'tia grave'olens*, by some called *Physian'thus auric'omus*, (lxviii. 3891.) further represent, but each in a different way, the singular structure and the strange beauty of this wonderful group. The star-fish flowers, which are species of *Stape'lia* (Bot. Mag. xv. 536, xvi. 585, xix. 724, xx. 786, xl. 1676, xliii. 1839, &c.) have angular stems and branches like those of some kinds of cactus, but covered with scaly protuberances instead of spines, and pentamerous corollas that are usually large in proportion to the plant, being 2—4 inches across, and often hairy. The latter are often quaintly variegated with dull colours, but of unpleasing aspect and odour, and, as the name denotes, not unlike star-fishes of the *Uraster* kind, both in their symmetry and in the shape and breadth of the five great petals, each of which presents the figure of an isosceles triangle. *Marsde'nias* (lx. 3289, lxxiii. 4299.) have fragrant white or yellowish blossoms; the handsome clusters of the *Calot'ropis* and the *Asteph'anus* are white and purple. *Philiber'tia grandiflo'ra* (lxiv. 3618.) has stems not thicker than a crow-quill, twining 6—8 feet high, and interpetiolar umbels of 3—5 yellowish flowers freckled with red.

Out of doors the most popular is the *Periplo'ca Græ'ca*, (Bot. Mag. xlix. 2289.) a luxuriant, semi-twining shrub, with innumerable pliant shoots, which adapt it excellently for arbours and porticos. In autumn its bright and glossy foliage mingles admirably with the crimson arras of the Virginian-creeper. The leaves are ovate-lanceolate, pointed, 3—4 inches long, and deciduous; the little star-like flowers are green upon the outside, brownish and with a remarkably velvety surface within. *Cynanch'ums* are inconspicuous harbaceous plants and low shrubs of twining habit, usually with white or greenish flowers, as *Cynanch'um Vincetox'icum* and *Cynanch'um ni'grum.* (Bot. Mag. l. 2390.) *Ascle'pias ni'vea* and *variega'ta* (xxix. 1181, 1182.) are rare species with beautiful umbels of white or pinkish flowers; those of the former drooping like the Virginian-cowslip; those of the latter densely sessile. The celebrated Canadian silk-weed is the *Ascle'pias Cornu'ti* or *Syria'ca.*

XCI. THE DODDER FAMILY.—*Cuscuta'ceæ.*

Like the *Monot'ropa* and the *Orobancha'ceæ*, the dodders are parasites. They differ, however, from both, in several important particulars. The stems are as fine as thread, and very much branched, and twine round the plants to which they attach themselves in a tangled mass, so as often almost to conceal them. They are annuals, commencing life in the earth, where the seeds vegetate, and whence they climb on to the objects of their attack, attaching themselves by minute tubercles to the surface of the stalks. As soon as they have secured a firm hold, they relinquish their connection with the soil, and steal their sustenance wholly from the victim. The plants selected for attack are heath, furze, thyme, nettles, thistles, flax, clover, &c.: to the latter, when sown as crops, they are exceedingly injurious. In colour, like other parasites, they are of a pale greenish-yellow, often turning to a lively red, which they retain till after blooming, when they become brown, and shortly afterwards disappear. The flowers are small, regular, usually pentamerous, sometimes 4-cleft, pale flesh or yellowish-rose colour, wax-like, and clustered in compact, nearly globular, lateral heads, the size of a large pea Stamens 4 or 5; ovary solitary; styles two. Capsule globular, with two cells and four seeds. Embryo destitute of cotyledons, and consisting only of a little spiral body. No leaves are produced at any time, nor even rudiments of leaves.

Dodders are found in the temperate countries of both hemispheres, and though in some cases no more than singular weeds, when upon farm-land they are often destructive pests. Some of the species are suitable for cultivation, at all events in greenhouses, where the phenomena of their life can be observed while their predatory tendencies can be checked. Such are *Cus'cuta Chilen'sis* and *Cus'cuta Epith'ymum*, which flower freely, and are very pretty.

Four or five are accounted British.

1. Corolla with 4—5 pointed and spreading lobes, and a short tube containing as many scales, which are prominent, and nearly close it. Plant much branched and entangled. Style protruding.
    - Clusters of flowers sessile. Perianth usually tetramerous. Stigmas acute. 1. COMMON DODDER.
    - Flowers on pedicels. Perianth usually 5-cleft. Stigmas capitate. 4. LUCERN DODDER.
2. Corolla with short and broad lobes, the scales in the throat inconspicuous and appressed. Style enclosed.
    - Calyx nearly or quite as long as the tube of the corolla; the tube globular while young, and permanently so. Plant greenish yellow. Stem nearly simple. Flowers only about five in a head, and much more fleshy than in the other species. 2. FLAX DODDER.
    - Calyx much shorter than the tube of the corolla; the tube becoming globular only as the capsule ripens. Plant red, twining to the height of 2—3 feet. 3. GREAT DODDER.

HABITATS AND DISTRIBUTION.

1. COMMON DODDER—*Cus'cuta Epith'ymum.*

Parasitic upon furze, heath, thyme, clover, and other plants of similar habit, when growing in dry and sunny places. Not rare in England and southern Scotland. Fl. July, August. Annual.

E. B. i. 55 (as *Cus'cuta Europæ'a*, erroneously.)

When the sepals are lanceolate and appressed, this plant is the *Cus'cuta Trifo'lii* of E. B. Supp. iii. 2898.

2. FLAX DODDER—*Cus'cuta Epili'num.*

Parasitic upon flax, and no doubt introduced with the seed sown for the crop. In 1857, a field of flax at Worsley, near Manchester, contained many hundreds of individuals. Fl. July, August. Annual.

E. B. Supp. iii. 2850.

3. GREAT DODDER—*Cus'cuta Europæ'a.*

Parasitic upon fern, thistles, nettles, heath, clover, brambles, and many other plants; but rather rare. Fl. July, August. Annual.

Curtis, iii. 466; E. B. vi. 378.

4. Lucern Dodder—*Cus'cuta Hassi'aca.*

This plant (which may prove to be only a variety of the Great Dodder) has been introduced with the seeds of lucern, and though not yet established in England, is quite likely to become so. Fl. August, September. Annual.

XCII. THE PRIMROSE FAMILY.—*Primula'ceæ.*

Herbaceous plants, seldom more than 6—18 inches high. Leaves simple, oval or lanceolate (in a few aquatic species pinnatifid); often in radical tufts; and either serrate or entire. Flowers on radical and solitary peduncles; in umbels on radical scapes; in panicles; or solitary or racemose in the axils of the leaves. Sepals five, usually combined for at least half their length. Petals five, uniform, more or less united, often so for half their length, the upper portion then spreading horizontally, or even reflexed. Stamens five, *opposite* the petals and attached to them. Stigma simple and usually capitate. Ovary solitary and one-celled.—Fruit a many-seeded capsule, with a free central placenta, which is often thick and globular. Seeds often shagreened upon the surface.

Several curious exceptions occur. In *Centunc'ulus* the flowers are tetramerous; in *Samo'lus* the ovary is partially inferior; in *Trienta'lis* the parts of the flower and the stamens are usually seven; in *Hotto'nia* and the Tufted Loose-strife they vary from five to eight; and in *Glaux* the corolla is absent and the stamens are hypogynous. But all have the peculiar ovary and placenta, and the stamens *opposite* the petals. In this last character lies the emphatic distinction between the Primulaceæ and the other herbaceous families that have regular flowers, with the petals adherent, and the stamens seated on the corolla. In all those other families (the *Gentiana'ceæ*, the *Hydrophylla'ceæ*, &c.) the stamens, instead of being opposite the petals are alternate with them. The character requires some care in observation, especially where the petals are scarcely united, and the stamens stand upright in the centre of the flower, as happens in the genus *Lysima'chia.*

The pretty and varied plants which constitute the Primrose family are plentiful in the northern and colder parts of the globe, growing in woods, meadows, pastures, by river and stream-sides, and on mountains, even to the snow-line. Their bright, unassuming, and often fragrant flowers are among the earliest harbingers of spring, and none are so generally known and admired. The primrose and cowslip in the fields, the polyanthus and auricula in the garden, never wear out their welcome or the florist's interest. Nature may be sought in vain for a flower more delicate than the *Trienta'lis*, or for a plant more brilliantly jewelled than the common pimpernel.

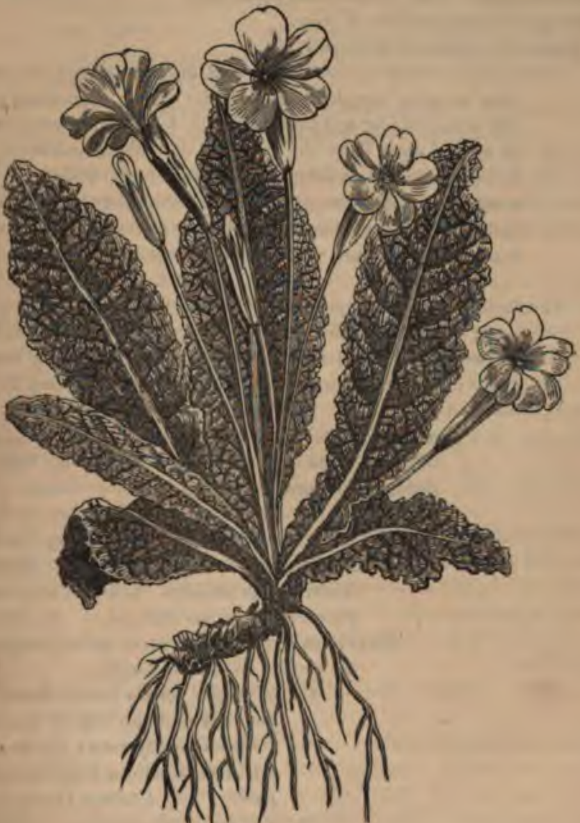

Fig. 138.
Primrose (*Prim'ula vulga'ris.*)

About 200 species are known, seventeen growing wild in Britain.

A.

STEMS AND FOLIAGE SUBMERGED IN WATER. Leaves pectinate. Flower-stalk rising to the height of 12—15 inches above the surface, erect, solitary, leafless, and terminating in a raceme of 5—7 rather distant whorls of handsome pale-purple blossoms, nearly the size of a primrose, and in the centre suffused with deep yellow. Petals and stamens 5—8. 1. WATER-FEATHERFOIL.

B.

GROWING ON DRY LAND, or, if in wet places, NOT SUBMERGED IN WATER. Leaves undivided.

I. Flowers tetramerous, minute, pink, and solitary. Stems 1—2 inches high; leaves alternate, ovate, longer than the flowers. 2. CHAFFWEED.

II. Parts of the flower usually in *fives*.

- Leaves all radical, or apparently so.

  Lobes of the corolla reflexed—i. e., bent backwards from the rim of the tube, so as to completely conceal the calyx. Root-stock consisting of a semi-globular and flattened tuber, ½—2 inches across, according to age. Leaves from the crown of the tuber, numerous, cordate, and pointed; the petioles 3—4 inches long. Peduncles from the same point, rather longer than the petioles, numerous, and bearing each a solitary and pendulous white or rose-coloured flower, which is often fragrant, and with the mouth remarkably circular. 14. IVY-LEAVED CYCLAMEN.

  Corolla usually yellow, "primrose-colour" or lilac, and consisting of a long straight tube, with five spreading or incurved lobes, which render the expanded part flat or concave. Sepals united for nearly their whole length. Anthers sessile. Capsule erect, opening by ten little teeth.

  + Leaves 3—9 inches long, light-green, puckered, broad and rounded at the end. Root-stock beset with thick reddish scales, which are the stumps of former leaves.

    Flowers on peduncles about ⅔rds as long as the leaves, and apparently *radical* and *solitary*, but in reality forming sessile umbels. Leaves oblong-ovate, tapering into petioles. Lobes of the corolla flat. Flowers sometimes dull red. 9. PRIMROSE.

    Flowers in umbels upon erect radical scapes, which are usually 3—9 inches high.

      Lobes of the corolla flat or nearly so, the flower resembling that of a primrose.—Pedicels mostly erect; the flowers looking in all directions, fragrant, and usually pale. COMMON OXLIP (p. 353.)

      Lobes of the corolla concave. Pedicels mostly half-pendulous, and hanging mostly on one side. Leaves oblong-ovate, but abruptly contracted in the middle. Flowers fragrant; sometimes dull red. Calyx bell-shaped. 10. COWSLIP.

      Lobes of the corolla concave. Pedicels and leaves much as in the preceding. No raised border to the orifice of the tube. Calyx tubular. Flowers scentless. 11. BARDFIELD OXLIP.

(GROWING ON DRY LAND, or, if in wet places, NOT SUBMERGED IN WATER. Leaves undivided. Parts of the flowers usually in *fives*. Leaves all radical.)

++ Leaves 1—2 inches long, in no degree puckered, glabrous upon the upper surface, and on the under one usually covered with whitish meal. Flowers in a compact umbel upon the summit of a radical scape which rises considerably above the leaves. Corolla pale blue or purplish rose-colour, with a yellow centre; occasionally white; the lobes narrow and deeply notched.

Ovary broadly-obovoid; stigma capitate. Scape 3—6 inches high; when in fruit often 12—15 inches high. 12. BIRD'S-EYE PRIMULA.

Ovary globose; stigma with five points. Corolla violet-purple, resembling that of an auricula. Plant not half the size of the preceding, but stouter. 13. HIGHLAND PRIMULA.

** Stem more or less leafy.

Leaves 3—6, clustered in an irregular whorl or tuft upon the summit of a slender, erect, and simple stem 3—6 inches high; the smaller ones obovate, the larger ones lanceolate and two inches long.—Flowers from the bosom of the tuft of leaves, white with a yellow ring, or occasionally pale pink, starlike and very delicate, the pedicels hairlike, and about an inch in length. Petals and stamens 5—9, usually seven. 15. TRIENTALIS.

Leaves numerous and dispersed over the plant.

1. Leaves alternate, obovate or roundish, and many of them radical.

Stems 3—24 inches high, more or less branched, according to stature, the branches terminating in little umbellate clusters of insignificant white flowers, the pedicels of which are rather long. As the flowering proceeds, the clusters elongate into racemes, like those of the Shepherd's-purse. 16. SAMOLUS.

2. Leaves mostly opposite, occasionally whorled. *Flowers yellow.*

a. Stems erect.

Flowers usually in large, terminal, leafy panicles, sometimes axillary and nearly solitary. Stems 2—3 feet high, branched at the upper part. Leaves ovate-lanceolate, opposite, or in whorls of 3—5. Petals broad, always 5. 5. GREAT PYRAMIDAL LOOSE-STRIFE.

Flowers in axillary racemes, which are shorter than the lanceolate leaves. Stems simple, 1—2 feet high. Parts of the flower 5—8. Petals narrow, pale, and spotted with orange. 8. TUFTED LOOSE-STRIFE.

b. Stems trailing and rooting. Leaves ovate or oval.

Calyx-segments ovate. Peduncles shorter than the leaves. Stems 1—2 feet long. 7. COMMON TRAILING LOOSE-STRIFE.

Calyx-segments linear. Peduncles longer than the leaves. Stems 6—12 inches long. Flowers like those of pimpernel. 6. LITTLE SYLVAN LOOSE-STRIFE.

(GROWING ON DRY LAND, or, if in wet places, NOT SUBMERGED IN WATER. Leaves undivided. Parts of the flower in *fives*. Stem leafy.)

3. Leaves mostly opposite, occasionally in whorls of 3—4; the flowers *not yellow*.
  - Flowers consisting of a pinkish calyx only, numerous, and sessile among the small, ovate or oblong and abundant leaves. Plant much branched, 3—6 inches high, and often succulent. 17. GLAUX.
  - Flowers with both calyx and corolla.
    - Leaves oblong, sessile, pointed. Stems 6—12 inches long. Flowers usually scarlet, sometimes blue, occasionally salmon-colour or white. 3. COMMON PIMPERNEL.
    - Leaves minute, nearly circular, petiolate. Branches 2—4 inches long. Flowers rose-colour, with darker veins, sometimes very pale. 4. BOG PIMPERNEL.

HABITATS AND DISTRIBUTION.

1. WATER-FEATHERFOIL—*Hotto'nia palus'tris.*

Ponds, lakes, reservoirs, little bays of slow rivers, and places such as water-lilies love to grow in. Not uncommon in the middle and east of England. Rare in the west and in Ireland, and in Scotland not met with, except where planted for ornament. Fl. May, June.

Curtis, i. 11; E. B. vi. 364; Baxter, vi. 421.

One of the prettiest water-plants this country produces, and excellent for the aquarium, in which the light-green and finely pectinated leaves show to perfection. In the full-grown state, or when the plant is in blossom, they resemble the bones of a fish, such as the sole, consisting of a central stalk, and numerous parallel divisions on either side.

2. CHAFFWEED—*Centunc'ulus min'imus.*

Dry, sandy, and gravelly moors; rather rare, though widely scattered. Fl. June, July. Annual.

E. B. viii. 531; Baxter, iv. 296.

3. COMMON PIMPERNEL—*Anagal'lis arven'sis.*

Dry fields, by waysides, among the stubble after the corn has been cut, and in kitchen-gardens, as a weed; common everywhere. Fl. June—October. Annual.

Curtis, i. 12; E. B. viii. 529; Baxter, i. 29.

At the base of every petal is a purple velvety spot, adding greatly to the brilliancy of this rich little flower, varieties of which occur of a salmon-colour, pale flesh-colour, pure white, and gentianella-blue, but all, except the last, very sparingly. The blue variety is by some esteemed a species, and called *Anagal'lis cœru'lea.*—(Curtis, iv. 592; E. B. xxvi. 1823.) The hairs upon the stamens consist of a string of globular cells, gradually diminishing in size towards the extremity, and resembling the beads of a necklace. In the binocular microscope, viewed with a rather low power, they present an extremely pretty appearance.

The structure of the capsule deserves close examination. In form it is perfectly spherical; in substance thin and pellucid; and the lower part is protected by the permanent calyx. If gently compressed, when nearly ripe, between the finger and thumb, it splits horizontally along its equator, the upper half falling off as a concave lid, while the lower one remains as a little cup, holding a green and tesselated globe, which is composed of the placenta and seeds, the latter rendered hexagonal by the reciprocal and lateral pressure. As soon as the capsule is ripe, and dried by the heat of the sun, the lid separates of its own accord, and the seeds are emptied out of the cup, which by this time is inverted, through the curving of the peduncle. The shape of the lid, which is itself a cup and perfect hemisphere, might have satisfied even Helen in the immortal fable.

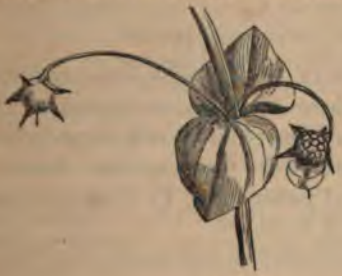

Fig. 139.
Capsule of Pimpernel.

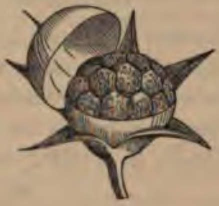

Fig. 140.
The same, enlarged.

The sensitiveness of the blossoms to atmospheric changes is well known, and is celebrated in the rustic name of "Shepherds' weather-glass."

4. Bog Pimpernel—*Anagal'lis tenel'la.*

Heaths and moors, where wet, and the grass is short and scanty; on banks, in boggy ground, where little springs of water ooze out, and along the borders of streamlets, among moss, especially near the sea. Common, but chiefly in the north and west. Fl. July—September.

Curtis, i. 160; E. B. viii. 530.

The capsule and the hairs upon the stamens resemble those of the *arven'sis*, and form part of the characteristics of the genus. Here, however, the hairs are so numerous as to render the filaments woolly. The foliage is seen in perfection towards October.

5. Great Pyramidal Loose-strife—*Lysima'chia vulga'ris.*

Banks of rivers, especially where shaded, and similar places of moisture; frequent, except in Scotland. Fl. July, August.

Curtis, ii. 311; E. B. xi. 761.

Common in gardens, especially in suburban ones in the north of England, and in those of Manchester, where the copious yellow flowers grin through the iron railings, and bid defiance to the smoke.

A very distinct variety, called *Lysima'chia Westpha'lica* or *puncta'ta*, has the pedicels rarely more than one-flowered, and confined to the axils of the stem-leaves. The sepals are narrow-lanceolate, and the petals are fringed with glandular hairs. *Lysima'chia cilia'ta*, a cultivated North American species, said to be half-naturalised in Cumberland and near Dumbarton, differs from the *vulga'ris* chiefly in its fewer and paler flowers, the petals of which are fringed, and in having its stamens free and spreading instead of united at the base. (E. B. Supp. iv. 2922.)

6. Little Sylvan Loose-strife—*Lysima'chia nem'orum.*

Woods and damp shady places; abundant everywhere, loving especially the steep sides of little ravines in cloughs and glens, where water oozes. Fl. May—October.

Curtis, ii. 310; E. B. viii. 527; Baxter, iv. 310.

7. Common Trailing Loose-strife—*Lysima'chia Nummula'ria.*

Shady and grassy ditch-banks, where its slender stems can trail and hang in wreaths, are the favourite abiding-place of this elegant plant, the blossoms of which are the largest of the native species. Common in England; in Scotland and Ireland rather rare. Fl. June—August.

Curtis, i. 159; E. B. viii. 528.

Like the great pyramidal loose-strife, a contented but less frequent, and seldomer-blooming inmate of town gardens.

8. Tufted Loose-strife—*Lysima'chia thyrsiflo'ra.*

Marshy places, and by the sides of streams. In England very rare, and found chiefly in the north. In Scotland more frequent. Fl. July.

E. B. iii. 176; Bot. Mag. xlv. 2012.

9. Primrose—*Prim'ula vulga'ris.*

Groves, open woods, and hedgebanks; abundant all over Britain, and nowhere in greater profusion than at Cotterill, Cheshire. Fl. April, May, and after mild winters, as early as February.

Curtis, ii. 380 (as *Prim'ula acau'lis*); E. B. i. 4.

Common in gardens, with many varieties, chiefly double yellow, lilac, crimson, and polyanthus-like, and occasionally with the flowers umbellate, as they are, in fact, in the fields, only that there the scape is usually undeveloped, and the umbel is sessile upon the crown of the root-stock, as may very plainly be seen by careful dissection. Individuals in which the scape is developed, are usually called *β caules'cens.* The flowers vary, even in the fields, to white, and when the plant grows upon clay, to dull red. Individual blossoms, then very rich and handsome, may occasionally be found with ten lobes to the corolla, and a central rosette of ten stamens.

10. Cowslip—*Prim'ula officina'lis.*

Meadows and pastures, chiefly upon clay. Abundant in England and Ireland; in Scotland rather rare. Fl. May.

Curtis, ii. 379; E. B. i. 5; Baxter, ii. 89 (the two latter as *Prim'ula ve'ris.*)

Common in gardens, both in its original form and in its lovely progeny, the innumerable varieties of polyanthus. Many varieties also occur which cannot be legitimately called by either name, having the form, though more luxuriantly, of the pasture cowslip, with the colour, incipiently, of the polyanthus. The most curious are those in which the calyx is partly or wholly changed into corolla. In one, tolerably common, and called "King Charles," the calyx is half green and half crimson; in another, a very old-fashioned plant, called "hose-in-hose," the calyx is an exact duplicate of the corolla; and in a third it is formed of five distinct leaves, miniatures in every point of the ordinary foliage of the plant, and excellently illustrating the physiological principle, that all the parts of flowers are resolvable into the LEAF, as their common type. The grandest elucidation of modern Botany is that the leaf, the sepal, the petal, the stamen, and the carpel, are so many different modifications of a single organic base, impressed with different forms, and entrusted with different functions, but essentially the same, and under certain circumstances exchangeable one for the other. (See "Life, its Nature, Varieties, and Phenomena," chap. xxvi. Ed. 2.)

Whether the primrose and the cowslip be really distinct, is by many botanists doubted, and some do not hesitate to call them modifications of a single type. For my own part I believe them genuine species. Specific distinctiveness, as before remarked, is not a matter wholly of shape. It includes the whole nature of a plant, its habits, tendencies, and capacities, and every circumstance connected with its life and position in the economy of the world. The primrose loves shade, growing on sheltered banks and in sylvan retreats, and blooms with the wood-anemone, or just as the latter is on the wane. The cowslip, on the other hand, seldom or never seeks the protection of trees, but courts the sunshine in the open fields, blossoming, in its wild state, when the primrose is past its prime, and keeping company with the meadow-orchis, which rarely opens till the anemones are all gone.

The difficulty about them appears to have arisen, in great measure, from a long-standing confusion with regard to the "oxlip." The plant commonly called the "oxlip" is frequent in the cowslip and primrose districts, growing with the former, in the open fields, though always as a solitary individual. It is a great favourite in cottage-gardens, and is figured in Curtis (iii. 458.) as *Prim'ula ela'tior*, under which name it is also described by authors generally, but to which it has no right. It resembles the cowslip in its inflorescence, but the limb of the corolla is nearly flat, the stalk is stouter and taller, the flowers are of proportionately greater size, and half-erect, like those of the garden polyanthus, of which it is probably one of the intermediate or proximate sources. Pale-flowered varieties remind us of the umbellated primrose—in fact it often resembles a handful of primroses placed on the scape of a pasture cowslip. The seeds produce, along with "oxlips" resembling the parent, cowslips, and even primroses. This is good evidence of its being a mule or hybrid between the cowslip and primrose, the result of the bees and other insects conveying the pollen from one kind of flower to the pistil of the other, as gardeners do when they hybridise plants artificially. Moreover, on the continent, where the cowslip and primrose are said to be rarely seen together, this "common oxlip" appears to be unknown. There the primrose is rather a southern plant, extending from France to the confines of Asia, while the cowslip is more of a northern one, extending as far as Finland. Both primrose and cowslip occur, it is quite true, near together beyond the Alps, but the former always as a plant of warm valleys, the latter as one of the mountains, and too far apart from one another to hybridise. Their intermixture in England is a lively type of the twofold nature of our climate, and it is not surprising that they should issue a form partaking of the characters of both species.

The true oxlip is a very different plant, common on the continent, but in England confined to the county of Essex. Though figured in E. B. in 1799, it was only determined to be a native of this country in 1842, when Mr. Doubleday, of Epping, discriminated it as the "Bardfield oxlip," by which name it is now known among botanists. It blossoms a month earlier than the hybrid; the flowers are scentless: they droop instead of standing nearly erect, and it reproduces itself unaltered, and without any intermixture of primroses and cowslips among its progeny. This, at least, is the experience of my friend Mr. Sidebotham, who has cultivated and carefully watched the plant for nearly twenty years. There are in England, accordingly, three genuine species—the primrose, the cowslip, and the Bardfield oxlip; and in addition to these, the hybrid or "common oxlip."

11. Bardfield Oxlip—*Prim'ula ela'tior.*

Meadows and moist woody places at Bardfield, Essex, in which parish the primrose does not exist. (Phytologist, i. 204.) Fl. April.

E. B. viii. 513. (The figure only. The description is of the common oxlip.)

12. Bird's-eye Primula—*Prim'ula farino'sa.*

Mountainous pastures in the north of England, both where wet and mossy, and upon limestone. At Settle, in the north-west of Yorkshire, the ground is in some places purpled with its lovely flowers, which have quite the aspect of a verbena. Plentiful also at Ambleside.—Very rare in Scotland, and not found in Ireland. Fl. early summer.

Curtis, ii. 378; E. B, i. 6.

13. Highland Primula—*Prim'ula Scot'ica.*

Sandy shores in the extreme north of Scotland. Caithness. Sutherland. Orkney Islands. Fl. July, a month later than the *farino'sa.*

Curtis, iii. 459; E. B. Supp. i. 2608.

14. Ivy-leaved Cyclamen—*Cy'clamen hederæfo'lium.*

Dry woods and banks in a few places in the south and east of England; probably an escape or outcast from gardens. Fl. April.

E. B. viii. 548 (as *Cy'clamen Europæ'um*); Baxter, vi. 505; Bot. Mag. xxv. 1001.

Commonly cultivated as an ornamental spring flower, both in pots and the open borders.

15. Trientalis—*Trienta'lis Europæ'a.*

Dry woods and bushy places upon the slopes of hills; sometimes on moors. Rare in England, and only found in the northern counties. In many parts of the Scotch Highlands common and plentiful. Brizlee

Hill, near Alnwick, abundant. Lomond Hill, Fifeshire, abundant; and in the highest luxuriance and profusion in the beech and fir woods of Kinnardy, Angus-shire. Not found in Ireland. Fl. June, July.

Curtis, iv. 605; E. B. i. 55; Baxter, v. 343.

16. SAMOLUS—*Samo'lus Valeran'di.*

Ditch-banks, marshy places, and in wet hollows among the sand-hills on the sea-coast; common. Fl. July—September.

Curtis, ii. 237; E. B. x. 703; Baxter, i. 11.

17. GLAUX—*Glaux marit'ima.*

Sea-commons; muddy flats upon the coast; on the banks of estuaries and tidal rivers; salt-marshes, &c. Common, and often so plentiful as to form a low dense herbage. Fl. May, June.

Curtis, iv. 595; E. B. i. 13; Baxter, iv. 246.

The connection of this plant with the normal Primulaceæ is traceable, and very satisfactorily, through the *Anagal'lis tenel'la.*

The Primulaceæ in cultivation are numerous, the polyanthus, the primrose, and the cowslip standing forth simply as their popular representatives. The first and third of these ring the changes only on red and gold, but the primrose varies to lilac and other tints, and in the double state scarcely seems to have come from the pale flower it was in the fields. The best polyanthuses are considered to be those which, in conjunction with an exceedingly rich and deep colour in the body of the petals, have them edged with a broad and even line of yellow, and the mouth of the tube closed by the anthers. It is considered a great ornament when the mouth has a kind of raised border surrounding it, and a great blemish if the stigma appears instead of the anthers, florists having their fancies, like other connoisseurs. The polyanthus and the cowslip are both very prone to have several flower-stalks agglutinated into a single one, when they resemble the clustered columns of a cathedral arch, and the union of the umbels gives a mass of 80—100 blossoms. Stem-union of this kind is not uncommon in plants, and is technically called *symphysis.* Equally beautiful with the polyanthus is the auricula, distinguished by the shortness of its calyx, and the whole plant being more or less whitened by a mealy powder. The leaves also are smooth and leathery, instead of puckered. The exquisite velvety surface, and the deep royal purple, crimson, claret, and copper-colour of the auricula, often with green or gray patches superadded, are almost unequalled among flowers.

Long before these open in the garden, the greenhouse is refreshed with the lovely blossoms of the "Chinese-primrose" or *Prim'ula Sinen'sis*, the lilac or white flowers of which are borne in large umbels, sometimes two storeys high, through the main shaft continuing to elongate. Some varieties are double, others fimbriated at the edges, but all are marked by the peculiar calyx, which is broad and distended at the base, and gradually narrowed upwards. No colours among flowers are so effective by lamp-light as white, lilac, and crimson. Hence for winter-evening decoration, the Chinese-primrose, like the Camellia, is unsurpassed. Several other Primulas are met with now and then, as the *Prim'ula cortusoi'des* and the *Prim'ula denticula'ta*. (Bot. Mag. lxviii. 3959.) Lovers of alpine plants are seldom without *Prim'ula Helve'tica*, and other little species from the mountains of the south of Europe; whence also come most of the miniature plants called *Soldanel'la*, *Androsa'cë*, and *Are'tia*, cultivated, like the former, chiefly by those who have beheld them first in their native wilds, on the margin of the snows of Switzerland, or in the defiles of the Pyrenees.—Summer brings different kinds of pimpernel or *Anagal'lis*, mostly annual, and with flowers of brilliant blue, or sometimes red, as in the *Anagal'lis frutico'sa*. At the same time, come exotic species of *Lysima'chia*, and the *Cortu'sa Matthi'oli*. (Bot. Mag. xxv. 987.)

None of the genera are more beautiful than those which have their petals reflexed, or bent back from the rim of the tube towards the peduncle. This is the case in the *Cy'clamen* and in the Virginian-cowslip or *Dodecath'eon*. The latter bears an umbel of lilac blossoms on the summit of a leafless stalk twelve inches high, the flowers on long peduncles, elegantly pendulous, and resembling a lady's half-opened silken parasol, the anthers projecting in the form of a golden stiletto. The exotic *Cy'clamens* are like the English one in general figure, but larger, and the orchid-like flowers are often highly fragrant. The leaves are often beautifully marbled. In the south of England they grow in the open garden; in the north they usually need the shelter of the greenhouse.

XCIII. THE THRIFT FAMILY.—*Plumbagina'ceæ.*

Pretty herbaceous or under-shrubby plants, at once distinguished from all other families of exogens in which the flowers are pentamerous and the five stamens are opposite the petals, by their plaited calyx, and solitary and one-celled ovary with a solitary ovule, the latter suspended from the apex of a cord which arises from the internal base of the ovary. This solitary ovary is crowned, moreover, with usually five styles, either quite distinct, as in Thrift and the genus *Stat'icë*, or united below the middle, so as to present only five long stigmas, as in *Plumba'go*. When more than one style is present in a flower, we naturally anticipate more than one cell to the ovary; here, however, it is just the contrary; and five styles being in any case rare and exceptional, the circumstance acquires a special interest. It is important to note these curious characters, since the genera differ extremely in foliage, inflorescence, and general figure, and even in the relation of the stamens to the ovary, and in the condition of the corolla. When the styles are free, so are the petals; when they cohere, the corolla is tubular below, and the stamens arise from the receptacle. Stems usually hard and stiff. Leaves simple, undivided, and entire; sometimes all radical; sometimes clustered; sometimes alternate. Inflorescence either in panicles or globular heads. Calyx tubular, plaited, and persistent; sometimes coloured and enlarged, and petal-like at the upper part. Petals remarkably thin; blue, red, or white, occasionally yellow.

The greater portion of these plants, of which about 160 species have been discriminated, are natives of the sea-coasts and adjacent salt-marshes of the temperate parts of the world, and especially of the basin of the Mediterranean. The remainder grow in mountainous places inland, the family, as a whole, reaching from Greenland to Cape Horn. The properties are various, and in some cases medicinal, and many species are highly prized by gardeners.

Four grow wild upon the coasts of Britain, and a fifth is reckoned British from its occurrence in the Channel Islands.

A.

FLOWERS IN NEARLY GLOBULAR HEADS; pink, pale purple, or sometimes white. Head upon the summit of a simple and leafless stalk, or "capitate scape," which rises out of the midst of a dense tuft of radical leaves to the height of 1—8—12—15 inches. Leaves 1—4 inches long, linear and evergreen; petals unconnected; styles free, hairy at the base.

Leaves very narrow, allowing room for only one principal vein, which forms a conspicuous midrib. Petaloid border of the calyx with five very short and slender teeth. Flower-stalk 1—9 inches high. 1. COMMON THRIFT.

Leaves sufficiently broad to allow room for 3—5 longitudinal and parallel veins. Teeth of the calyx much attenuated. Flower-stalk 12—15 inches high. 2. RIBWORT THRIFT.

B.

FLOWERS IN CORYMBOSE PANICLES, blueish-purple; the panicle terminating an erect, rigid, and leafless stem, (which, being radical, is properly a "panicled scape") and consisting of numerous, unilateral and leafless spikes. Calyx, after flowering, much enlarged, and resembling a new corolla. Leaves all radical. Petals unconnected.

Leaves 2—6 inches in length, elliptical or oblong, quite entire, glabrous, leathery, and narrowed into petioles. Stem 6—18 inches high, the lower part usually unbranched or nearly so; the branches of the corymb numerous, and spreading so as to render it flat at the top. Anthers yellow. Flowers sometimes white. 3. SEA-LAVANDER.

Leaves small and spathulate.

Branches of the panicle all or nearly all clothed with flowers.—Scape branched from below the middle; the panicle elongated, and the spikes erect. Anthers white. 4. ROCK STATICE.

Lower branches of the panicle much divided and entangled, and mostly without flowers. Scape branched from near the base, and acutely forked. Flowers on the upper branches small and very much crowded. Plant 3—6 inches high. 5. CASPIAN STATICE.

HABITATS AND DISTRIBUTION.

1. Common Thrift—*Armé'ria marit'ima.*

Muddy sea-shores, and in pastures and the crevices of rocks by the seaside; extremely common. Found also on the borders of little rills, upon the summits of some of the loftiest Scottish mountains. Fl. June—September.

Curtis, iii. 471; E. B. iv. 226 (both as *Stat'icë Arme'ria.)*

This charming and well-known little plant, which often gives a roseate tinge to pastures that slope towards the water-side, as on the southern shores of the Bristol Channel, though it best loves the ocean breeze, grows equally well when remote from it. The neat cushion-like mode of its growth adapts it excellently for the edgings of flower-borders, to which purpose it is frequently applied, especially in suburban gardens, innumerable flowers decking them prettily in early summer. In the Orkney Islands it shrinks almost into the earth, the head of flowers, instead of being elevated upon a scape,lying sessile in a nest of leaves. Intermingled with the flowers there are numerous chaffy scales; the outer ones form a basket or "involucrum," and the outermost are prolonged downwards into a brownish sheath that surrounds the upper portion of the stalk. This sheath was at first attached by the base, but the growth of the stalk tears it away, causing the raggedness of the margin, as happens with the calyptra of mosses.

2. Ribwort Thrift—*Armé'ria plantagin'ea.*

West side of the island of Jersey, in the sandy district called the Quenvais; plentiful. Fl. June, July.

E. B. Supp. iv. 2928.

3. Sea-lavander—*Stat'icë Limo'nium.*

Muddy sea-shores, on the borders of estuaries, and in salt-marshes. In England and Ireland common; in Scotland very local, and confined perhaps to the southern coast. Fl. July, August.

E. B. ii. 102; Baxter, iii. 183.

A very interesting plant, named not from the scent of its flowers, for like those of all the rest of the family, they are destitute of odour, but from their delicate lilac or lavander hue. A variety, with the stem much branched at the lower part, and with the spikes lax and erect, instead of dense and recurved, as in the normal condition, is by some botanists distinguished as the *Stat'icë rariflo'ra* or *Stat'icë Bahusien'sis.* (E. B. Supp. iv. 2917.) Not common.

4. Rock Statice—*Stat'icë spathula'ta.*

Dry and rocky places on the sea-shore; rarely in sand. Generally distributed, but nowhere common, and chiefly on the southern and western sides of the island. Kent. Anglesea. Scotland. Ireland. Channel Islands. Fl. June—September.

Bot. Mag. xxxix. 1617; E. B. Supp. i. 2663 (as *Stat'icë binervo'sa.)*

When the branches are shorter and less divided, and more confined to the upper part of the scape than in the usual state of the plant, it becomes the *Stat'icë Dodar'tii* of those who call the normal form *occidenta'lis.*

5. Caspian Statice—*Stat'icë reticula'ta.*

Muddy salt-marshes and sea-coasts; rare. Norfolk, all along the northern coast, but principally at Cley and Wisbeach. Suffolk. Cambridgeshire. Lincolnshire. Fl. July, August.

E. B. v. 328.

The genus from which this family receives its name consists chiefly of slender climbing perennials, with ovate-lanceolate leaves, and racemes of flowers not unlike those of a Phlox, and having the calyx covered with long glandular hairs that form interesting objects for the microscope. Coming from the East and West Indies, and the Cape of Good Hope, they ordinarily need the shelter of the greenhouse, where their graceful appearance and the long continuance of their bloom, render them great favourites. Several species are common, such as the old-fashioned *Plumba'go Capen'sis*, the flowers of which are lavander-blue, the *Plumba'go ro'sea*, and the white *Plumba'go scan'dens.* The Persian *Plumbaginel'la micran'tha*, a little annual with white flowers, is remarkable for its sagittate and amplexicaulent leaves; *Valora'dia plumbaginoi'des*, by some called *Plumba'go Larpen'tæ*, (Bot. Mag. lxxv. 4487.) is an annual from Shanghai, with obovate leaves and large flat-faced corollas of a deep violet colour.

Stat'icë and *Arme'ria* have many representatives, the former chiefly in greenhouses, the latter in the open garden. *Stat'icë sinua'ta* is one of the most beautiful of our common conservatory plants; the large broad leaves are deeply waved along both margins, like those of the Rusty-back fern, and the great level-topped panicles are of a bright and lasting blue. *Stat'icë arbo'rea* from Teneriffe, (Bot. Mag. lxvi. 3776.) grows 4—6 feet high, and produces abundance of white and lilac flowers; *Stat'icë specio'sa*, (xviii. 656.) hardy, but very rare, has curving wreaths of a lively rose-colour; the flowers of the very handsome *S. Tatar'ica* are of the same hue; *S. Bonduel'lii* is distinguished by its yellow flowers. In many of this genus the stem is two-edged, and elegantly winged on each side with green, like that of the everlasting-pea, while the peculiar forking of the branches, and the unilateral disposition of the flowers, seen in the common sea-lavander, is preserved. *Stat'icë Arara'ti* or *Acantholi'mon gluma'ceum*, is a pretty little alpine from the mountains of Armenia, with rose-coloured flowers in a rather dense panicle. The exotic *Arme'rias* are like the *marit'ima*, only larger, and 12—18 inches high.

XCIV. THE PHLOX FAMILY.—*Polemonia'ceæ.*

Ornamental and usually small herbaceous plants, the only exception in point of size being the *Cobœ'a*, which climbs to the height of many yards. Leaves usually opposite and simple, sometimes deeply pinnatifid or *quasi*-pinnate. Flowers regular, pentamerous, the petals usually united into a tube at the lower part, sometimes very slightly connected. Stamens five, alternate with the petals. Ovary solitary and three-celled; style solitary; stigmas three. The three-celled ovary is eminently characteristic, distinguishing this family from all other exogens that have the stamens inserted upon the corolla, and especially from the *Primula'ceæ*, which the blossoms, in many cases, a good deal resemble, but in which the ovary is only one-celled. The flowers are usually borne in panicles, or umbellate clusters, and exhibit a great variety of bright and pleasing tints, but none appear to evolve odour. The pollen is often blue, whatever be the colour of the corolla. Pollen of this tint is not uncommon where the *flowers* are blue, but it is remarkable to find it blue when the corolla is of some other colour. The seeds are usually numerous, and remarkable, in several instances, for having their outer skin or "testa" provided with a vast number of exceedingly delicate and minute spiral threads, which lie coiled up on the outer surface, spire within spire, and are embedded in a kind of hardened mucus. Immediately the seeds are put in water, the mucus softens and dissolves, and the spirals dart out, enveloping the seed in a cloud of long and light gray ringlets. Of course it is only under the microscope that this truly beautiful phenomenon can be witnessed. To observe it to the greatest advantage, a bit of the testa should be cut off, and laid in a drop of water, with the surface uppermost. The seed of the common *Collo'mia* (purchaseable at any seed-shop) is the best and most manageable.

The temperate parts of America are the chief abodes of the plants of this family; they are unknown in the tropics, and a few only inhabit Asia and Europe. One species, widely diffused over the higher latitudes of the northern hemisphere, occurs also in England:—

An elegant perennial, with leaves formed of 20—30 lanceolate and entire segments resembling leaflets, disposed in pairs on a stalk eight inches or more in length, and growing in dense radical tufts of a light and tender green. Stem erect, simple, angular, panicled, 12—18 inches high, with a few leaves resembling the others, only smaller, and a showy terminal corymb of blue or white flowers. Petals broad, round, and but slightly united. Anthers large and yellow. JACOB'S LADDER.

HABITATS AND DISTRIBUTION.

JACOB'S LADDER—*Polemo'nium cœru'leum.*

Dry waste places and upon hedgebanks in several parts of the north of England; but rare. Lovers' Leap, near Buxton. Malham Cove, &c., Yorkshire. Fl. June, July.

E. B. i. 14; Baxter, ii. 149.

Very common in gardens, especially old-fashioned ones.

Few families of such limited extent supply our gardens with so many pretty flowers. Foremost among them are the forty or fifty species of *Phlox*, beginning in the spring, and lasting till the very end of autumn, when their large panicles of white or lilac corollas, shaped like those of the primrose, mingle beautifully with the golden-rod and China-asters. The delicate and showy annuals belonging to the genera *Leptosi'phon*, *Gil'ia*, *Ipomop'sis*, *Can'tua*, &c., and the very singular though unattractive *Ægochlo'a*, (Bot. Mag. lvii. 2977.) belong to the same pleasing race; and in green-houses we have the luxuriant climber called *Cobæ'a scan'dens.* The fine glaucous green of the smooth and ample foliage; the exquisitely attenuated and many-branched tendrils which terminate the great *quasi*-pinnate leaves; and the large, solitary, violet or purple and bell-shaped flowers, followed by ovoid berries, place the *Cobæ'a* in the front rank of desirable conservatory plants. *Hoit'zias* are handsome Mexican plants, with blue or red corollas. *Fenz'lia dianthiflo'ra* is a gay little annual from California.

XCV. THE BORAGE FAMILY.—*Boragina'ceæ.*

Herbaceous plants of very decided character, and for the most part attractive and interesting. *E'chium vulga're*, or Vipers' Bugloss, is one of the noblest of our native plants, and the blue of the forget-me-not seems unique.

Stems ordinarily erect, three inches to three feet high, (ten feet in *E'chium gigan'teum)* sometimes procumbent, and often succulent with cold and watery sap. Leaves alternate, simple and undivided, lanceolate or oblong, and narrowed at the base; occasionally oval or ovate and pointed, and then either sessile or upon slender petioles. Flowers usually in racemes that, while young, are coiled spirally inwards like a fern-leaf, but which unroll as the blooming proceeds and become nearly straight. (Fig. 80, p. 41.) Corolla pentamerous and usually regular; then either flat and star-shaped, or with the petals united into a long and narrow tube that assumes more or less of a deep saucer-form at the extremity, and is often provided with an inner ring of pointed scales. Stamens five, inserted upon the petals, and alternate with them, and though occasionally projecting, usually quite concealed. Ovary solitary, two or four-lobed, the divisions, when ripe, resembling seeds, and having the surface rugged, prickly, downy, or corrugated, though sometimes as smooth and shining as porcelain, and quite as hard. Calyx 5-cleft, usually permanent, and covering the four-fold fruit; sometimes withering so as to leave it quite exposed. The entire plant is very commonly harsh and bristly with strong white hairs; yet many species are velvety or pubescent, and a few are glabrous and glossy. Viewed with a low magnifying power, the hairs of the rough-stemmed species are frequently perceived to rise out of little mounds resembling heaps of pearls; in others they have a conical or globular pedestal, and resemble great white horns. The flowers are of all the accustomed colours, vivid blue predominating, and the tints are generally bright and clear. The blue ones, when in bud, and when they open, are often pink or reddish, so that it is not unusual to see blossoms of several shades in the same raceme. Most that possess this colour are prone to vary to white. A considerable time elapses between the opening of the earliest flowers and the latest; if gathered and put in water, they renew their freshness day by day; chaplets of forget-me-not are at their best when a week old. It is rare for the flowers of this family to be sweet-scented, and they are never observed double. The racemes are often branched, or else collected into great panicles. Occasionally, instead of being racemose, the flowers grow 2—3 together, or even singly, in the axils of the upper leaves, and there are species in which the inflorescence is nearly cymose.

Over twenty grow wild or as colonists in Britain, and in the opinion of some authors, nearly thirty.

A.

STAMENS PROTRUDING MORE OR LESS BEYOND THE MOUTH OF THE COROLLA-TUBE.

1. Plant nearly glabrous, glaucous, or rarely grass-green. Stems procumbent, 12—18 inches long. Leaves ovate, tapering into broad petioles, and sprinkled on both sides with callous white points. Flowers in terminal and leafy clusters, regular and fine purple. Stamens slightly projecting. 7. MERTENSIA.
2. Plant rough in every part with bristly hairs. Flowers brilliant blue; occasionally pink or white. Stamens projecting considerably.
    - *a.* Corolla perfectly regular, flat and star-like. Stamens purplish-black, equal in length, and forming a large and prominent cone. Stem 1—2 feet high, branched, and quite erect. Leaves ovate-lanceolate and wavy. Flowers in drooping panicles; the buds pink. 11. BORAGE.
    - *b.* Corolla rather irregular. Stamens unequal in length, and not forming a central cone.
        - Tube of the corolla about as long as the calyx, and its lowermost lobes shorter than the longest of the stamens. Plant 1—4 feet high, erect and branchy. Leaves lanceolate, the radical ones soon decaying. Flowers in numerous short spikelets, which are curved while young, afterwards erect, and clustered into a compound raceme 1—2 feet in length. 1. COMMON ECHIUM.
        - Tube of the corolla very short, and dilated into a broad throat; the lower lobes as long as the longest stamens. Plant branchy and spreading from the base. Leaves as in the preceding, but the radical ones remaining green till a much later period. Flowers fewer, but large and brilliant. 2. VIOLET ECHIUM.

B.

STAMENS QUITE WITHIN THE COROLLA-TUBE.

1. Corolla long, straight, and tubular, with five very small teeth or lobes; the mouth closed by five lanceolate scales.

Stems 2—3 feet high, branched, stout, and somewhat succulent. Leaves broadly lanceolate, 6—12 inches long; the lower ones petiolate, the upper ones sessile and decurrent. Racemes short and branched. Corolla dingy-purple or yellowish-white. Plant rough and hairy.
8. COMMON COMFREY.

Stem simple, 12—18 inches high. Leaves mostly ovate and petiolate. Upper ones nearly sessile, and scarcely decurrent. Flowers few, yellowish-white, tinged with green.
9. TUBEROUS-ROOTED COMFREY.

Stem 4—5 feet high, plentifully sprinkled, as well as the ovate and acute leaves, with small white and curved prickles. Bracts opposite.—Flowers pink while young; afterwards metallic blue.
10. PRICKLY COMFREY.

2. Lower half of the corolla tubular; upper half in five deep lobes, which are either concave, or flat and horizontal.

a. Tube of the corolla *bent in the middle*. Flowers bright blue. Stem procumbent at the base, branched, 1—2 feet long. Leaves lanceolate, wavy at the edges. Whole plant very bristly. 12. FIELD BUGLOSS.

b. Tube of the corolla *straight*.

A. Mouth of the corolla *open*, that is to say, without scales or stamens closing the entrance.

Calyx tubular and 5-cleft; the clefts extending to the middle only. Flowering-stems numerous, crowded, erect, 6—12 inches high. Lower leaves ovate-lanceolate, petiolate, usually spotted with greenish-white on the upper surface; upper ones nearly sessile. Corollas red or violet, according to age; sometimes white.
3. COMMON LUNGWORT.

Calyx 5-cleft to the base.

† Flowers insignificant, whitish or pale yellow. Stems erect, 12—18 inches high.

Plant perennial. Leaves lanceolate, rather acute. Achenia grayish-white, very smooth and shining, and of stony hardness.
4. COMMON GROMWELL.

Plant annual. Leaves nearly linear, and obtuse. Achenia brown, deeply wrinkled, and extremely hard. Root with bright-red bark. 5. CORNFIELD GROMWELL.

†† Flowers brilliant blue, and very conspicuous. Plant perennial. Stems procumbent, 1—2 feet long, the flowering-branches erect. Leaves lanceolate and hairy. 6. PURPLE GROMWELL.

(STAMENS QUITE WITHIN THE COROLLA-TUBE. The tube *straight.*)

B. Mouth of the corolla *closed*, either by the stamens or by little scales.

- † Calyx broadly-campanulate, much enlarged as soon as the corolla fades, and then forming two flat walls to the ovary. Plant weak and procumbent, very rough and prickly. Leaves narrow. Flowers few and small, axillary, 1—3 together, light blue. 15. ASPERUGO.
- †† Calyx not enlarged after flowering.
  - * Flowers intense and brilliant blue, in unilateral spikes, with *a bract to every pedicel.* Plant 2—3 feet high, rough with rigid hairs.
    - Leaves lanceolate, 2—6 inches long. Flowers in terminal panicles formed of unilateral spikes; the sepals longer than the petals. 13. COMMON ALKANET.
    - Leaves broadly ovate, deep-green. Flowers in short axillary clusters. Plant stout. 14. EVERGREEN ALKANET.
  - ** *No bracts to the pedicels.*
    1. Flowers dull brownish-crimson or claret-coloured. Achenia large, exposed, flattened, rather convex, and rough with hooked prickles. Limb of the corolla concave.
       - Leaves velvety with greyish down, broadly lanceolate, 6-12 inches long. Stem stout, 1—3 feet high, erect and branched. Plant exhaling a nauseous odour when bruised. 16. COMMON HOUND'S-TONGUE.
       - Leaves bright green and shining upon the upper surface; rough with scattered hairs upon the under one. Plant nearly scentless. 17. GREEN-LEAVED HOUND'S-TONGUE.
    2. Flowers usually azure-blue, with a yellowish centre; occasionally white or yellowish. Achenia small, ovoid, smooth, and concealed in the calyx.
       - Calyx never divided below the middle; the bristles upon it straight and appressed. Stems 12—18 inches high. Plant usually glabrous. Flowers usually large and brilliant; sometimes insignificant. 18. POETS' FORGET-ME-NOT.
       - Calyx always cleft to below the middle; the bristles upon it spreading or hooked.
         - *a.* Pedicels almost erect, shorter than the calyx; corolla very minute.
           - Stem erect, without branches at the lower part. Corolla yellow or creamy-white, turning blueish as it fades.—Calyx always closed over the ripening fruit. Plant 3—12 inches high. 22. HARLEQUIN-WEED.
           - Stem much branched from the base. Corolla always deep blue. Calyx, for the most part, permanently open.—Plant 1—6 inches high. 21. EARLY DWARF FORGET-ME-NOT.

(STAMENS QUITE WITHIN THE COROLLA-TUBE. The tube *straight*, and the mouth *closed.*)

b. Pedicels spreading, and longer than the calyx. Stems 3—18 inches high.

Limb of the corolla flat. Flowers showy. Plant perennial. 19. SYLVAN FORGET-ME-NOT.

Limb of the corolla usually concave. Flowers inconspicuous. Plant annual or biennial.
20. FIELD FORGET-ME-NOT.

3. Achenia prickly. Stem branched, and, as well as the lanceolate leaves, covered with silky and appressed hairs. Flowers blue.
23. ECHINOSPERMUM.

HABITATS AND DISTRIBUTION.

1. COMMON ECHIUM—*E'chium vulga're.*

Dry waste places, especially where gravelly or rocky; in dry fields; upon hillsides and old walls; sometimes in the open parts of woods. Common, except in the north. Fl. June, July. Biennial.

E. B. iii. 181; Baxter, iii. 189.

2. VIOLET ECHIUM—*E'chium viola'ceum.*

Sandy waste places about St. Hélier, Jersey, abundant. Fl. August. Biennial.

E. B. Supp. iii. 2798.

In an earlier volume of E.B. (xxix. 2081.) a figure is given of *E'chium Ital'icum.* The *Ital'icum* is not a native of Britain, and appears to have been drawn by mistake for the *viola'ceum.*

3. COMMON LUNGWORT—*Pulmona'ria officina'lis.*

Woods and thickets; rare, and probably a garden runagate. Fl. April, May.

E. B. ii. 118 (flowers only); Baxter, ii. 102.

Extremely common in gardens, at least in old-fashioned ones, and in the dusty little flower-plots in front of wayside cottages. In these it is prized for its early blossoms and spotted leaves, and best known as the "Jerusalem-cowslip."

A variety with lanceolate leaves, often without spots, is by some called *Pulmona'ria angustifo'lia.* (E. B. xxiii. 1628.) It grows abundantly in some of the woods and thickets of the Isle of Wight, particularly in those near Quarr Abbey and the Solent, and is plentiful also in woods in Hampshire.

4. COMMON GROMWELL—*Lithosper'mum officina'le.*

Dry waste places; among bushes on rough hill-sides; in hedges, on rubbish-heaps, &c. Common, except in Scotland. Fl. June, July.

E. B. ii. 134.

5. CORNFIELD GROMWELL—*Lithosper'mum arven'se.*

Cornfields, and dry waste places; when in cultivated land, often lost for a year or two, through the changes of the crops. Fl. May, June. Annual.

E. B. ii. 123.

6. PURPLE GROMWELL—*Lithosper'mum purpu'reo-cœru'leum.*

Woods and thickets, chiefly upon chalk and limestone; rare, and only found in the south of England. Plentiful in two or three localities in Somersetshire. Fl. June, July.

Curtis, iii. 457; E. B. ii. 117; Baxter, iv. 301.

7. MERTENSIA—*Merten'sia marit'ima.*

Among sand and loose pebbles upon the sea-coast; rare, and almost confined to the extreme north. Abundant in Caithness and Sutherland, at John o' Groat's, in Arran, the Isle of Skye, &c. Rarely as low as North Wales. Fl. May, June.

Curtis, ii. 382 (as *Lithosper'mum); E. B. vi. 368 (as *Pulmona'ria.)*

One of the most beautiful and remarkable plants of Great Britain.

8. COMMON COMFREY—*Sym'phytum officina'le.*

Borders of ditches, banks of rivers, low and wet waste places, and in the corners of swampy fields; common, as far as the south of Scotland. Fl. May—July.

Curtis, ii. 235; E. B. xii. 817; Baxter, ii. 101.

Frequent in cottage and farm-house gardens, being esteemed in rustic medicine both for man and cattle.

9. TUBEROUS-ROOTED COMFREY—*Sym'phytum tubero'sum.*

Moist and shady places; principally in the north of England. Fl. July.

E. B. xxi. 1502.

10. PRICKLY COMFREY—*Sym'phytum asper'rimum.*

A common plant in gardens, originally from the Caucasus; now half naturalised in many places, chiefly on the borders of streams. Cheshire. Oakford Valley, near Bath. Fl. summer and autumn.

Bot. Mag. xxiv. 929.

11. BORAGE—*Bora'go officina'lis.*

Best known as a garden-plant, but often occurring in waste ground and upon rubbish-heaps, no doubt with garden origin, and usually failing to establish itself for more than a year or two. On cliffs near the sea, as at East Looe, Cornwall, it obtains a better hold. Fl. July—September. Annual.

E. B. i. 36; Baxter, i. 66.

Originally from the Levant. The flat and starlike corollas, of the intensest Italian azure, and the prominent cone of stamens, which are so deeply purple as to seem black, remind us of the blossoms of the potato and the nightshade, both of which they closely resemble in figure. The stem is succulent with watery juice, and remarkably cold. By reason of this, Borage was formerly in great repute as a refrigerant. Every part of the plant is thickly studded with long white bristles, pointed enough to prick the fingers if we be not careful. When crushed, it has the smell of cucumber.

12. Field Bugloss—*Lycop'sis arven'sis.*

Dry waste ground, and in neglected fields, especially near the sea. Southport, Lancashire, abundant. Fl. June—September. Annual.

Curtis, ii. 309; E. B. xiv. 938; Baxter, i. 21.

13. Common Alkanet—*Anchu'sa officina'lis.*

Waste places, chiefly near the sea; in all likelihood derived from garden seeds, being commonly cultivated. Fl. June, July.

E. B. x. 662.

14. Evergreen Alkanet—*Anchu'sa sempervi'rens.*

Waste ground, by road-sides, and among ruins; in various parts of England and Scotland, but nowhere in plenty, and probably in most or all cases, a garden runagate. Fl. May, June.

Curtis, iii. 456; E. B. i. 45; Baxter, i. 48.

The specific name refers to the permanence of the radical leaves during the winter.

15. Asperugo—*Asperu'go procum'bens.*

Moist waste ground; rare, and chiefly in the south-east. Fl. June, July. Annual.

E. B. x. 661; Baxter, vi. 466.

16. Common Hound's-tongue—*Cynoglos'sum officina'le.*

Dry, waste places, chiefly upon limestone; still more abundant upon sandhills near the sea, and on sea-commons, where the tide does not reach. Fl. June—August. Biennial.

Curtis, ii. 233; E. B. xiii. 921; Baxter, vi. 477.

The great square fruits cling to the clothing like those of the *Ga'lium Apari'ne.*

17. Green-leaved Hound's-tongue—*Cynoglos'sum sylvat'icum.*

Hedgebanks and by waysides; rare, and chiefly in the south of England. Fl. June, July. Biennial.

E. B. xxiii. 1642.

18. Poets' Forget-me-not—*Myoso'tis palus'tris.*

Edges of rivers and clear streams; sometimes on the borders of swamps and marshes, and by shallow and muddy water-courses. Common. Fl. July—September.

Curtis, i. 158 (as *Myoso'tis scorpioi'des*); E. B. xxviii. 1973; Baxter, i. 57.

The celebrity of this plant as the emblem of constancy rests popularly upon the legend related in Mills' "History of Chivalry" (i. 315.) But the true ground of it lies farther back than the days of tournaments, and is of quite another nature, as spoken of in "Manchester Walks and Wild-flowers" (p. 31.) It is not always so brilliant a flower as we are led to expect by its more familiar appearance. Those large, broad flat corollas that make wreaths of the colour of the turquoise, belong only to the typical form. The stems and leaves of this are usually glabrous, and the lobes of the calyx are short and broad. Other forms, almost equally abundant, have small and unattractive flowers, the limb of the corolla sometimes not longer than the tube, and often concave. These are generally distinguished under the names of *Myoso'tis cæspito'sa* (E. B. Supp. i. 2661.) and *Myoso'tis re'pens* (Supp. ii. 2703.) The former haunts ditch-banks and muddy edges of pools, growing among rushes and other semi-aquatic plants, and is common in the north of England; the *re'pens* occurs in spongy places by the sides of ponds and streamlets, and is principally found in the south. Both, however, occur all over the country, and also in Scotland and Ireland. The straight and appressed hairs upon the calyx distinguish them from all our other species of the genus.

19. Sylvan Forget-me-not—*Myoso'tis sylvat'ica.*

Woods and groves; chiefly in the north of England. Extremely common on the Cheshire side of Manchester. Fl. April—June.

E. B. Supp. i. 2630.

The flowers come with the first fine days of spring, accompanying the arum and the goldilocks, and in the cloughs and little woods of northern Cheshire, form unbroken masses of blue as extensive as those ordinarily formed by the sylvan hyacinth. They hold their places until overwhelmed by the innumerable rose-lychnis.

Upon the high ledges of Ben Lawers and other lofty mountains of the Scotch Highlands, this plant becomes very dwarf, the flowers gaining, at the same time, in size and brilliancy. In this condition it is by some botanists called *Myoso'tis alpes'tris* and *Myoso'tis rupic'ola.* (Curtis, iv. 590; E. B. xxxiv. 2559.)

20. Field Forget-me-not—*Myoso'tis arven'sis.*

Dry fields and hedgebanks; common everywhere. Fl. May, June. Annual.

E. B. Supp. i. 2629. (The *arven'sis* of E. B. xxxvi. 2558 is *M. colli'na.*)

A pretty little flower, enamelled and brilliant like the preceding, but in size not to compare with them. Almost always distinguished by a solitary and drooping flower in the bosom of the uppermost leaf, some distance below the commencement of the raceme.

21. Early Dwarf Forget-me-not—*Myoso'tis colli'na.*

Dry, open, grassy places, and especially fond of growing among short turf. Not very common, and found chiefly in the south. Clifton Down, near Bristol. Fl. March—May.

E. B. xxxvi. 2558 (as *Myoso'tis arven'sis.*)

Possibly not distinct from the *arven'sis.*

22. Harlequin-weed—*Myoso'tis versic'olor.*

Dry arable fields, and along the edges of seldom-travelled roads and grass-bordered lanes; not uncommon. Fl. May, June. Annual.

E. B. vii. 480 (as *M. scorpioi'des*, the coloured figure.)

A very distinct species.

23. Echinospermum—*Echinosper'mum Lap'pula.*

A continental weed, probably introduced with ballast, having only been noticed near the sea, in the south-east, and very sparingly. Fl. July, August. Annual.

The finest Boraginaceæ grown for ornament are the native species already mentioned. In addition to these there are foreign Echiums of great beauty, especially *E'chium can'dicans*, an old-fashioned species from Madeira, growing four feet high, and common in greenhouses; *Anchu'sas* also, as *Anchu'sa panicula'ta* and *Anchu'sa tincto'ria* or "Dyers' Alkanet," the roots of which latter communicate a fine red colour to oils, wax, and unctuous substances in general, as well as to spirits of wine, and are much used in the preparation of lip-salves and other compounds which look the better for being tinted. *Onos'mas* are curious plants, usually covered with hairs, and producing pendulous and tubular yellow flowers, as in the common *Onos'ma Tau'ricum.* (Bot. Mag. xxiii. 889.) Honeyworts are species of *Cerin'the*, a genus distinguished by having the achenia combined in pairs, and very odd-looking in its flowers and foliage, which in the common honeywort or *Cerin'the ma'jor* (x. 333.) is perfectly glabrous. *Myoso'tis Azo'rica* (lxx. 4122.) is a very showy Forget-me-not. *Merten'sia pulmonarioi'des*, formerly called *Pulmona'ria Virgin'ica*, (v. 160.) is an extremely beautiful plant with ovate and sessile leaves, and drooping clusters of blueish-purple flowers. "Venus' Navel-wort" or *Omphalo'des linifo'lia*, is a favourite little white-flowered annual with the seeds umbilicated. *Omphalo'des ver'na* has the configuration of a primrose plant; the leaves are ovate and petiolate, and the bright azure flowers appear in early spring. *Amsinck'ias* are pretty annuals with yellow flowers, chiefly from California. *Macrome'ria exser'ta* is a fine half-hardy perennial from Mexico, with large yellow corollas and long protruding stamens and pistil. *Cynoglos'sum pic'tum*, (xliv. 1934.) and two or three others of the same genus, as *C. Dau'ricum* and *cœlesti'num;* the evergreen *Arne'bia echioi'des* (lxxiv. 4409.) with yellow and purple flowers in dense umbellated cymes; *No'nea flaves'cens* and *viola'cea*, the white-flowered *Sym'phytum orienta'le*, and many more of the family may also be met with, but ordinarily they are not much cared for, and, generally speaking, the microscopist find more pleasure in them than the florist.

XCVI. THE HELIOTROPE FAMILY—*Ehretia'ceæ.*

These plants were reckoned, until the time of Martius, as a portion of the *Boragina'ceæ.* They have been detached from that family on account of the four lobes of the ovary being perfectly confluent, the style being terminal, and the fruit being drupaceous. It is observed also that the seeds often contain free albumen, the presence of which, though it may seem of little moment, is always very significant. The flowers, like those of the *Boragina'ceæ*, are usually borne in circinate racemes, and are regular and pentamerous. Most of the species are trees and shrubs, and nearly all belong to the tropics.

Two or three only are cultivated, and none very commonly except the delicious Heliotrope itself, which happens to be a species by no means typical. The subtle and fugitive odour of this popular flower has gained for it the name of "Cherry-pie." It is better comparable perhaps to that of noyau. As a late autumn flower, there is nothing worthier of the garden; if kept in the greenhouse, it will grow six or eight feet high, and put forth its lilac nosegays all through the winter. *Heliotro'pium Europæ'um* is sometimes grown by the curious, and occasionally the *Tournefor'tia heliotropioi'des.* (Bot. Mag. lviii. 3096.)

XCVII. THE RIB-WORT FAMILY.—*Plantagina'ceæ.*

A family of about 120 little herbaceous plants, usually stemless; the leaves ovate, lanceolate, or pinnatifid, and growing either in upright tufts, or in flat rosettes a few inches in diameter and lying close upon the surface of the ground. When ovate or lanceolate, the blade is provided with strong ribs. Flower-stalks radical, leafless, bearing at the summit a dense and ovoid, or long and cylindrical spike of minute blossoms, the parts of which are in fours, generally dry and chaffy, and with the lobes of the corolla reflexed. Stamens four, with long and flaccid filaments; anthers large and conspicuous. Ovary solitary, ovoid, 2 or 4-celled. Fruit a tiny capsule of thin texture, and opening transversely like that of the pimpernel. Seeds one, two, or many. In certain exotic species of *Planta'go* the stem is developed, and becomes branched and leafy; and in the *Littorel'la* the flowers are unisexual, or nearly so, and instead of growing in spikes, are solitary and terminal. In this genus also the female flower is three-cleft.

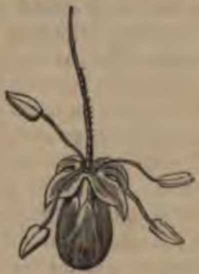

Fig. 141.
Flower of *Planta'go*, greatly magnified.

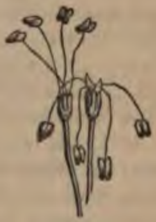

Fig. 142.
Male flowers of *Littorel'la.*

The *Plantagina'ceæ* are found all over the world, but chiefly in temperate countries, growing in dry and waste places, in meadows and pastures, and by the sea-side, often close to high-water mark.

Six species occur in Britain.

A. FLOWERS UNISEXUAL AND SOLITARY. Leaves narrow-linear, 1—4 inches long, and bright green. Peduncles of the male flowers 2—3 inches high, with the blossom at the apex; the stamens, which form the most conspicuous part of it, often an inch long; the anthers large and ovate. Female flowers sessile in the axils of the leaves, at the base of the stalk of male flowers; the perianth 3-lobed, and the style filiform. 1. LITTORELLA.

B. FLOWERS BISEXUAL AND CLUSTERED INTO SPIKES.

1. Leaves pinnatifid, the segments linear and cut, more or less hairy, and, unless casually drawn up, perfectly flat upon the ground, resembling a little star with the rays branched. Spikes cylindrical, 1—3 inches long, and resembling small ears of beardless wheat. Capsule 4-seeded. 2. BUCK'S-HORN.

2. Leaves linear, 4—12 inches long, according to the luxuriance of the plant, entire or very slightly toothed, channelled, thick and fleshy. Flower-stalks numerous; the spikes of flowers cylindrical and 1—3 inches long. Anthers yellow, conspicuous though small. 3. SEASIDE PLANTAGO.

3. Leaves undivided and strongly-ribbed.

   Anthers purple; the filaments short. Leaves broadly-ovate, often many inches long, petiolate, 7-ribbed, the margins wavy or toothed. Flower-stalk cylindrical; flower-spike 3—12 inches long, quill-shaped, the flowers at the base rather distant. Cells of the capsules many-seeded. 4. GREAT RIB-WORT.

   Anthers white; the filaments very long. Spike of flowers ovoid or oblong, and compact. Cells of the capsule one-seeded. Flower-stalks 3—20 inches high.

      Flower-stalk cylindrical; leaves ovate, gray-green, flat on the ground, the petioles very short; flowers silvery; filaments pale purple. 5. WHITE RIB-WORT.

      Flower-stalk angular; leaves lanceolate, petiolate, five-ribbed, when mature nearly erect, and with tufts of soft white woolly fibres at the base. Spike 1½ inch long, sometimes much less, and often with 2—3 smaller spikes from the base. Bracteas black and imbricated. 6. COMMON RIB-WORT.

HABITATS AND DISTRIBUTION.

1. LITTORELLA—*Littorel'la lacus'tris.*

Margins of lakes and pools, where the soil is sandy; common all over Britain, but probably often unobserved, as it is prone to remain under water, without flowering. The leaves then become longer and grass-like. In the lakes of North Wales it grows several feet under water, but never blossoms except when close to the edge, or where the water is not more than an inch in depth. Fl. June, July.

Curtis, iv. 642; E. B. vii. 468; Baxter, iv. 284.

2. Buck's-horn—*Planta'go Coron'opus.*

Dry, sandy places, waysides, and slopes of dry hills, and especially on dry and sandy flats by the sea; common. Fl. May—August.—Annual.

E. B. xiii. 892.

Often called "Star-of-the-Earth," from the beautiful stellate figure of the foliage as it lies close upon the surface.

3. Seaside Plantago—*Planta'go marit'ima.*

Muddy places, upon banks and among stones, and in the crevices of rocks by the sea; also upon the borders of estuaries and along the embouchures of rivers: very common. Occasionally upon the margins of fresh-water lakes, and near the summits of the loftiest mountains of Wales and Scotland. Borders of Loch-lomond. Twll-du, Snowdon. Fl. July—September.

Curtis, iv. 586; E. B. iii. 175.

4. Great Rib-wort—*Planta'go ma'jor.*

By waysides, borders of fields, and on heaps of roadside rubbish; common everywhere. Fl. July—October.

Curtis, i. 83; E. B. xxii. 1558; Baxter, iii. 207.

In gardens there is sometimes grown an extraordinary variety, in which, instead of a spike of flowers, there is a rose-like tuft of green leaves.

5. White Rib-wort—*Planta'go me'dia.*

Dry fields and waysides; a common plant of the limestone districts, the meadows of which it greatly ornaments with lilac and silvery spikes that seem powdered with white anthers. Fl. July.

Curtis, ii. 231; E. B. xxii. 1559.

6. Common Rib-wort—*Planta'go lanceola'ta.*

Meadows and pastures; profusely everywhere, and often a principal element of the hay-field. Fl. May—September.

Curtis, i. 82; E. B. viii. 507.

No plant of the meadows is more conspicuous; for though the flowers are minute, the large white anthers make it visible from a long distance. The lowermost blossoms open first, and the upper ones gradually afterwards, every successive set surrounding the spike with a zone of white, which mounts by degrees from the bottom to the top. A variety, found in gardens, has, in place of flowers, a tuft of bracteas.

XCVIII. THE NEMOPHILA FAMILY.—*Hydrophylla'ceæ.*

The *Hydrophylla'ceæ*, as known in England, are pretty little annuals of the flower-garden, with pentamerous flowers, five epipetalous stamens, and a solitary ovary. At the base of every lobe of the corolla there are generally two little scales, which greatly help to identify such species as have the flowers axillary and solitary, the inflorescence of the greater portion being circinate, like that of the Borage family. *Nemoph'ilas*, the commonest, have weak, trailing, and branchy stems, 6—8 inches in length, and cup-shaped corollas supported on long and solitary peduncles. *Eu'tocas* are remarkable for the deep blue of their corollas; and *Phace'lias* for their resemblance as to flowers, though not in odour, to the heliotrope. The species not cultivated include many that are shrubby and arborescent. Though somewhat heterogeneous, and without any absolute diagnostic character, as a whole they are easily distinguished from the families nearly related to them by taking, in each case, a different organ. Thus, from the Borage family, with which they agree in their frequently rough leaves, and in the incurved racemes of flowers seen in *Phace'lia*, they are differentiated by their one-celled ovary; and from the Primrose family, which they agree with in regard to the placenta, and occasionally in some particulars of habit and aspect, they are told by their stamens being alternate with the petals. There are not a hundred species altogether, and few are found out of America.

XCIX. THE ARDISIA FAMILY—*Myrsina'ceæ.*

The technical characters of the Myrsinaceæ are very nearly the same as those of the Primrose-family. The stamens are opposite the united petals of a regular and pentamerous corolla, and the placenta is free and central. In the fruit, however, they differ considerably, this part being in the Myrsinaceæ fleshy and indehiscent. They are also, without exception, trees and shrubs, while the Primulaceæ are all herbaceous, and there is a very general tendency in them to be glandular. None of the species grow wild in Europe, and the greater portion belong to the antipodes.

In our greenhouses these plants are valued for their ornamental and evergreen foliage, and occasionally for their flowers and fruit. *Ardis'ia crenula'ta*, (Bot. Mag. xlv. 1950.) a very common species, has dark-green elliptical and leathery leaves, crenelled along the margins, and lateral umbels of red or white flowers, formed like those of a *Sola'num*, the five lobes of the corolla presenting a starlike figure, though somewhat reflexed, and the five large anthers standing up as a cone in the centre. The ovary is solitary and globular, and, along with the stamens, is thickly sprinkled with minute black dots. The flowers are followed by clusters of long-continuing red berries the size of a pea, which in winter render the plant highly ornamental. Other flowers are open by the time that the berries of the earlier ones become ripe, so that two seasons are presented simultaneously—a beautiful phenomenon occurring in most of the genus, though by no means confined to it, nor yet to the family. *Ardis'ia solana'cea* (xl. 1677.) and *Ardis'ia panicula'ta* (l. 2364.) put forth innumerable rose-coloured flowers. The last-named is the finest of the genus, growing into a small tree, with large laurel-like leaves. The branches of the panicles and the peduncles are lively pink; the flowers remain a long time in the bud state, and, the colour being more intense, are even handsomer in that condition than when open. *Jacquin'ias* are extremely pretty shrubs, with showy orange or red or white flowers, as in the tolerably-common *Jacquin'ia auranti'aca.* (Bot. Mag. xl. 1639.) *Theophras'ta imperia'lis* has an unbranched stem, crowned with superb leaves, shaped like those of the Spanish Chesnut, and thirty inches long. *Theophras'ta Jussieu'i* is scarcely inferior in the beauty of its holly-like foliage. *Clavi'jas* hold equal rank, and for the same reason. The typical species, now very seldom seen, is the old-fashioned and uninteresting *Myrsi'ne Africa'na*, a Cape shrub with obovate and serrated leaves, and small, axillary and brownish flowers.

C. THE NOLANA FAMILY.—*Nolana'ceæ.*

Ornamental annuals from Chili and Peru, with trailing stems and branches, and showy flowers very like those of the "Convolvulus minor," but lavander colour instead of blue. They are distinguished from the Convolvulaceæ by the valvate instead of imbricated calyx; and from the Boraginaceæ by the carpels being never less than five, and generally many more, and by the inflorescence never being circinate. Several species occur in gardens, as *Nola'na prostra'ta*, (Bot. Mag. xix. 731.) *Nola'na atriplicifo'lia*, and *Nola'na paradox'a* (lii. 2604.)

CI. THE JESSAMINE FAMILY—*Jasmina'ceæ.*

Slender, twiggy shrubs and small trees, the stems sometimes twining, and the leaves simple and undivided, or ternate, or *quasi*-pinnate, and entire. Flowers regular, in little corymbs, white or yellow, and generally sweet-scented. Sepals and petals each 5—8; the former united nearly to the summit; the latter combined for their lower half into a tube, and at the upper part free and spreading, with the lobes overlapping at the edges, and often pointed. Stamens two, or casually three, epipetalous, and concealed in the tube of the corolla. Ovary and style solitary. Stigma 2-lobed. Fruits, in the true jessamines, a didymous berry, one of the lobes of which is very commonly abortive; in the *Nyctan'thes*, a bipartite capsule. In some particulars these plants resemble the *Olea'ceæ*, but in that family the flowers are regularly tetramerous in every part; whereas here the lobes of the perianth and the stamens bear no precise numerical relation. They may be at once distinguished from all other plants as the only ones in which the stamens are uniformly *two* (unless by the accidental interposition of a third) and the lobes of the corolla of a disproportionate number, 5—8 as above stated.

The species are natives chiefly of tropical India, in all parts of which region they abound. Two or three belong to the warmer parts of the south of Europe. Fragrance is their predominant quality, though all are valuable for their neat and pretty flowers, and several for their endurance of the smoke of towns. For the walls of suburban gardens there is no plant more precious than the common white Jessamine or *Jasmi'num officina'le*. The innumerable long and pliant shoots are of so deep a colour as to make it look in winter, though deciduous, like an evergreen; the white and starlike corollas last from May till the end of September, but come out in greatest plenty about August, growing in light sprays at the extremities of leafy twigs, and yielding an odour that might well have captivated the old Persian who baptised the plant "ysmyn" or "the fragrant," and gave us in that name the origin of *Jasmi'num*. This plant never looks prettier than when trained so as to form the roof of a trellissed arbour. Against house-fronts it will rise to the height of 50 feet, and if led round the upper windows so that the shoots shall hang down like curtains, and allow of being drawn aside as if they were drapery, there is nothing perhaps that produces a sweeter effect. In Convent-gardens the white Jessamine is still the especial favourite it has been for ages. The common yellow Jessamine, with ternate leaves, is the *J. fru'ticans*. The curl-flowered yellow or *J. revolu'tum* (Bot. Mag. xlii. 1731.) is known by its alternate and *quasi*-pinnate leaves, the surface of which is glabrous and shining. The Chinese-yellow or *J. nudiflo'rum* opens its flowers in November, and blooms throughout the winter, a delicious though leafless ornament for a sheltered garden-wall. *Jasmi'num Sam'bac* or the White Arabian (xliii. 1785.) has simple and ovate leaves and twining stems, and is frequently double. The Indian-yellow or *J. odoratis'simum* (viii. 285.) has alternate leaves with 3—5—7 lobes, and flowers well deserving the name of most-fragrant. The Italian-yellow or *J. hu'mile*, the Madeira-yellow or *J. Azo'ricum*, the *grandiflo'rum*, *undula'tum*, *gra'cile*, and several others, are also cultivated, though not so generally, and no less than eighty or ninety more are known to science. The "Sorrowful-tree" or *Nyctan'thes Arbor-tris'tis*, has cordate leaves and exquisitely fragrant white flowers, which open at sunset and fall at sunrise, whence the pathetic name. In England it very seldom blooms, and not being of much interest unless in flower, has never become common.

CII. THE SAGE FAMILY.—*Labia'tæ* or *Lamia'ceæ*.

In the Labiatæ we have another family of great extent and high importance, and one of the few that scarcely deviate in a single instance from their central idea. In no family are the species more alike, and thence more easily identified as members of it; nor in any is there a greater similarity of products, the latter including almost all those aromatic and oily secretions which render mint, sage, thyme, lavander, basil, rosemary, patchouli, bergamot, and a hundred others, so agreeable either as condiments to our food, or as perfumes for our clothing and the atmosphere. It includes nearly all the savoury plants which in the kitchen-garden are known as "pot-herbs;" not a single species is deleterious, though in a few cases the aroma is exchanged for fœtor, as happens in the wound-wort;—many, on the other hand, by reason of their tonic and stimulating properties, have from time immemorial been esteemed in medicine. Such are horehound, peppermint, balm, ground-ivy, and calamint. The delicious flavour of Narbonne honey is ascribed to the bees feeding largely on the rosemary and other Labiates of the borders of the Mediterranean; and in our own country, wherever wild thyme abounds, the honey appears to acquire a corresponding quality.

The species, which are probably not fewer than 2,500, are found in most of the temperate parts of the world, the maximum of their abundance lying between the parallels of 40° and 50° north latitude. They grow in hot, dry, exposed situations—on the breezy hill-side, the ledges of the southward-looking cliff, the warm and crumbling bank, loving sunshine and fresh air; occasionally also in marshy places and by the sides of ponds. Similar and unmistakeable as they always are, there is still considerable diversity in their characters, even more, perhaps, than is indicated in the following summary.

Herbaceous or undershrubby plants, often very downy, hairy, or shaggy, the stems for the most part four-sided, especially when succulent, and with opposite branches. Height, ordinarily, 12—50 inches, though the *Hyp'tis membrana'cea* of Brazil attains the stature of 20—40 feet, while a few species are moss-like. Leaves invariably opposite and simple, varying in outline from narrow-lanceolate to ovate and broadly heart-shaped; in a few cases lightly pinnatifid or 3—5-cleft, and often elegantly serrated or crenate. Flowers generally clustered in the axils of the leaves, then usually sessile and very numerous, whence it appears as if they were whorled; sometimes in little axillary cymes called *verticillastri;* or in many little rings in the axils of bracteas at the top of the stem, forming loose open spikes or pyramids, that taper off nearly to a point. In some species, as the common *Prunel'la,* they form, with the aid of bracteas, dense, terminal, and cylindrical solids; in others, such as the common germander, they are distributed in light panicles, the branches of which are frequently unilateral. When axillary in the main foliage, the clusters are often so dense as to form convex and nearly solid rosettes, the stem rising through the centre; and if the corollas be large and hooded, as in the yellow dead-nettle, they form a little circular verandah. In a few instances the flowers grow in axillary pairs, and there are instances where they are axillary and solitary. Calyx tubular, often ribbed, the ribs usually 5 or 10, sometimes 15, and the tube either 2-lipped or with five pointed teeth. Corolla usually very irregular, more or less mouth-shaped or "labiate," and deeply cleft, (Fig. 145.) the upper lip often very large, and either flat, or arched and concave; sometimes so minute that the lower lip becomes the principal part of the flower. Stamens four, two of them usually

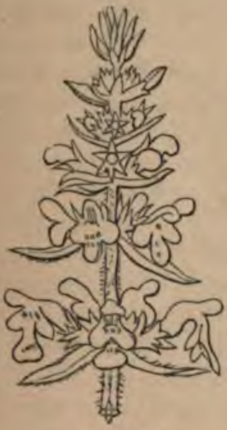

Fig. 143.
Hedge Wound-wort
(*Sta'chys sylvat'ica.*)

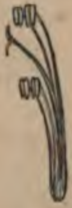

Fig. 144.
Didynamous stamens.

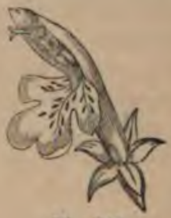

Fig. 145.
Labiate corolla.

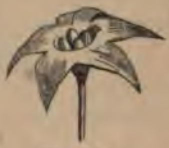

Fig. 146.
Calyx and fruit of Labiate plant enlarged and opened.

much longer than the others; sometimes, by deficiency, only two in all. In the former case they are called "didynamous." (Fig. 144.) Ovary 4-lobed; the style arising from the base, curved in the same direction as the stamens, and the stigma usually cleft. Fruit consisting of the four lobes of the ovary, which fall apart when ripe, becoming four little achenia, that lie at the bottom of the persistent calyx, and appear to be "naked seeds." (Fig. 146.) It was in allusion to this that Linnæus called the Order in which he placed the plants of this family "Gymnospermia;" but truly naked seeds, *i.e.*, seeds destitute of a pericarp, occur only in the Coniferæ and their allies. Excellent and ready examples are supplied by the *Sta'chys sylvat'ica* and the *Sal'via Verbena'ca.* The leaves and the calyx are very apt to be strewn with minute bags of aromatic oil, which give these plants the peculiar odour above referred to, and form exquisite objects for the microscope, especially when the oil is coloured, as in the ruby-beaded *Orig'anum Oni'tes.* The calyx of the common sage looks as if sprinkled with spheres of gold, while the bags upon the leaves are green or nearly colourless. In many species there are numerous large and handsome bracts, as in the *Prunel'la* and all of the genus *Orig'anum;* and these often acquire brilliant hues, as in many species of *Sal'via* and the *Monar'da.* The flowers are of almost every known colour; the red

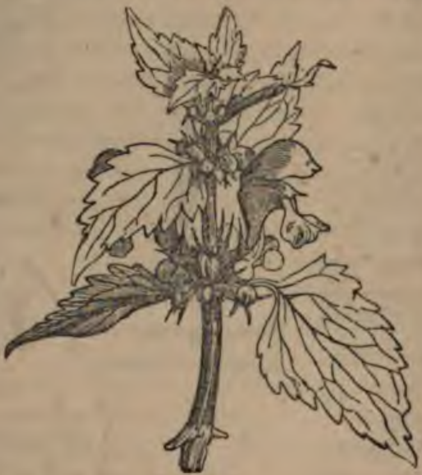

Fig. 147.
White Dead-nettle (*La'mium al'bum.*)

and blue ones with a strong tendency to change to white, and very many are variegated. They are seldom fragrant, and never double. In many species, such as those of the genus *La'mium*, the anthers are of some unusual and vivid tint, and, like the surfaces of the leaves and calyx, furnish extremely interesting objects for the binocular microscope. It is not unusual to find the anthers disposed in little squares or double crosses, and when the corolla possesses an upper lip, they are generally found sheltered underneath it. In examining the flowers it must not be overlooked that the upper lip of the corolla, consisting of two united petals, is opposite the three united sepals of the two-lipped calyx; and that the two united sepals which form the upper half of the calyx are opposite the three united petals of the corolla.

About 45 grow wild or have become naturalised in England, many of them with several marked varieties. Several others seem disposed to mingle with our native Flora, as *Teu'crium Bo'trys* and *Elsholtz'ia crista'ta.* The former is a little garden perennial from the south of Europe, with pinnatifid and cut leaves, and axillary red flowers with no upper lip to the corolla. The *Elsholtz'ia* is also a common garden plant, native of Siberia, with ovate and serrate leaves, and erect and unilateral spikes of pinkish flowers, protected by large and veiny bracts.

SECTION I.

COROLLA minute, bell-shaped, 4-cleft, and NEARLY REGULAR. Stamens two or four, distant, straight, and diverging upwards. *(Flowers never either blue or yellow.)*

A. *Stamens two.* Plant 1—2 feet high, erect, not much branched, and nearly glabrous. Leaves ovate-lanceolate, in part pinnatifid at the base, serrated, pointed, and nearly sessile. Flowers in crowded axillary whorls, white, dotted with red. 9. GIPSY-WORT.

B. *Stamens four.* Flowers usually lilac or rosy pink. Plant with a strong and usually agreeable odour (*Mints.*)

1. Whorls of flowers all *axillary*, the uppermost pair of leaves having no flowers above it, or rarely a very few.
    - *a.* Flowering-branches *prostrate* and very numerous. Leaves ovate, seldom ½ inch long, entire or nearly so, the upper ones usually recurved. Whorls distant. Plant nearly glabrous. 2. PENNYROYAL.
    - *b.* Flowering-branches *erect* or nearly so. Leaves ovate, 1—2 inches long, serrate and petiolate. Plant downy. Whorls of flowers dense.
        - Calyx campanulate, the teeth short. 8. CORNFIELD MINT.
        - Calyx long and tubular, the teeth narrow and slender. 7. WHORLED WATER MINT.

(Corolla minute, bell-shaped, 4-cleft, and NEARLY REGULAR. *Stamens four.*—Flowers usually lilac or rosy pink. Plant aromatic.)

2. Flowers in *globular and terminal heads*, with a few dense clusters occasionally in the upper axils. Leaves ovate and serrated. Plant 1—2 feet high, usually downy, sometimes nearly glabrous, and the foliage often purplish. 6. COMMON WATER MINT.

3. Flowers in *terminal and cylindrical spikes*, formed of numerous whorls.
    - *a.* Leaves upon short stalks, ovate-lanceolate, serrated, and acute. Stems 1—4 feet high, rounded, and nearly erect. Whole plant glabrous or nearly so. Lower whorls of the spike often distant. 3. PEPPERMINT.
    - *b.* Leaves mostly sessile.
        - Plant glabrous and very green. Leaves narrow lanceolate and acute. Stems 2—3 feet high, and acutely four-cornered. 1. SPEAR-MINT.
        - Plant downy or hairy.
            - Leaves narrow-ovate or lanceolate, pointed, serrate, and very white underneath. Spike slender, often interrupted at the lower part. 5. HORSE-MINT.
            - Leaves broadly-ovate or circular, very obtuse, much wrinkled, shaggy on the under surface, and all sessile. Spike dense. 4. ROUND-LEAVED MINT.

SECTION II.

COROLLA VERY IRREGULAR, apparently consisting of no more than a large 3—5-lobed and PENDULOUS LOWER LIP, the UPPER LIP being either VERY SMALL, or cleft to the base, and the lobes thrown to the sides. *Stamens four*, parallel and *projecting*.

A. Leaves deeply divided into three linear lobes, the lower ones less so, and the lobes of the upper ones sometimes deeply cut. Plant with numerous spreading branches, 4—6 inches long, hairy and viscid, the foliage much crowded. Flowers axillary and solitary, yellow, speckled with red. 47. YELLOW BUGLE.

B. Leaves undivided, though usually serrate.

1. Flowers all looking one way, whatever their disposition upon the plant.
    - *a.* Flowers pale straw-colour or greenish yellow, in large erect panicles, formed of numerous unilateral spikes. Leaves oblong-ovate, petiolate, and much puckered. Stamens purplish-red. Plant 1—2 feet high. 42. COMMON GERMANDER.
    - *b.* Flowers reddish-purple, (rarely white) large and handsome, 2—3 together in the axils of the leaves, and forming a terminal and leafy racemose cluster. Stem 6—8 inches high, much branched, and nearly erect. Leaves ovate, petiolate, and deeply cut at the upper part. 44. CRIMSON GERMANDER.
    - *c.* Flowers red, in distant whorls of 2—6. Stems *procumbent*, 1—2 feet long. Leaves oblong, sessile, downy, and serrated. 43. MARSH GERMANDER.

(Corolla very irregular. No upper lip. *Stamens four*, parallel and *projecting.*)

2. Flowers looking in all directions, usually violet-blue, sometimes white, rarely pink. Flower-stem consisting at first of a short, compact, and grayish-blue pyramid; afterwards growing taller, and sometimes becoming an erect, solitary, and leafy spike, with the flowers in the axils. Leaves obovate, 1—2 inches long, entire, or broadly serrate or crenate, the lower ones narrowed into petioles.
    - *a.* Plant with prostrate and leafy shoots, spreading 6—12 inches from the base of the flower-stem, which is 4—12 inches high, and every part glabrous or nearly so. Upper portion of the same tinge as the flowers. 45. Common Bugle.
    - *b.* No prostrate shoots. Plant very hairy. Spikes always remarkably pyramidal. 46. Alpine Pyramidal Bugle.

SECTION III.

Corolla very irregular, and distinctly 2-lipped; the upper lip often large and vaulted. Yellow the only or the predominant colour of the flowers. Stamens four.

A. *Perennial.* Flowering-stems 1—2 feet high, simple and erect, and bearing axillary whorls of very handsome full rich yellow flowers, the lower lip with orange-brown streaks like those of a tiger-skin. Leaves two inches long, ovate, pointed, serrate, and petiolate. 27. Yellow Dead-nettle.

B. *Annuals.* Lower lip of the corolla spreading. Flowers clustered.

1. Plant 1—3 feet high, strong, branchy, and harsh with long stiff hairs.—Internodes swollen just under the leaves, which are ovate, pointed, serrate, and petiolate. Calyx-teeth terminating in long and pungent thorns. Corolla an inch long, very handsome, pale yellow, with a broad violet patch upon the lower lip. 33. Large Variegated Hemp-nettle.
2. Plant scarcely a foot high, downy with soft hairs, the upper part almost white and silky with them. Internodes not swollen. Leaves narrow-ovate or lanceolate. Flowers an inch long. 31. Downy Hemp-nettle.

C. *Annual.* Lobes of the lower lip of the corolla reflexed. Stem erect, downy, 6—12 inches high, the branches spreading. Leaves oblong-lanceolate.—Flowers in axillary whorls of about six. 37. Yellow Stachys.

SECTION IV.

Corolla very irregular, and distinctly 2-lipped; the upper lip often large and vaulted. Flowers red, lilac, blue, purple, or white; often somewhat mottled or freckled, especially upon the lower lip.

A. *Stamens two.* Flowers violet-blue. Stems 1—2 feet high. Leaves few, ovate or oblong, obtuse, wavy along the edge, crenate and much corrugated.—Flowers in distant and leafless whorls.

1. Corolla an inch long, rich blue, and very handsome. 11. Blue Meadow Salvia.
2. Corolla scarcely longer than the calyx, insignificant and inconspicuous. 10. Vervain Salvia.

(COROLLA VERY IRREGULAR, and distinctly 2-LIPPED. Flowers RED, BLUE, WHITE, &c.)

B. *Stamens four.* PLANT PERENNIAL.

1. Only the *flowering-stems erect*, the others *prostrate and creeping.*
    - *a.* Stems and branches wire-like, 6—18 inches long, woody, and much entangled; those with flowers rarely more than 2—4 inches high. Leaves minute, ovate, entire, fringed at the base. Plant aromatic, sometimes very hairy all over. Flowers crimson. 12. WILD THYME.
    - *b.* Leaves cordate or reniform, 1—3 inches across, crenate, hairy, and on long petioles. Flowers in axillary whorls of six, (three to each leaf) large, fine violet-blue, occasionally white. Anthers white, and placed thus:—$\overset{)(}{)(}$ Plant with a powerful and disagreeable odour. 21. GROUND-IVY.
2. Plant completely *covered in every part with long white silky hairs*, no green being anywhere visible. Stem simple, erect, 1—2 feet high. Leaves ovate, lanceolate, and petiolate. Flowers numerous, light-purple, in axillary whorls that form a leafy spike. 38. LAMB'S-EAR STACHYS.
3. Plant *white and hoary* in every part with cottony hairs. Plant bushy, 1—2 feet high, branching from the base. Leaves nearly circular, petiolate, and much wrinkled. Flowers in dense, convex, axillary whorls, white and insignificant. Calyx-teeth ten, sharp and *recurved.* 40. HOREHOUND.
4. *Leaves deeply 5-cleft*, the upper ones deeply 3-cleft, and the lobes pointed. Stem 2—3 feet high, branching chiefly at the lower part. Flowers light-purple, axillary, the whorls forming a long, thin, leafy spike. Upper lip of the corolla shaggy with white hairs. 29. MOTHERWORT.
5. Flowers in heads or clusters which are all or nearly all terminal and *above the principal foliage of the plant.*
    - *a.* Flowers in a dense, terminal, and cylindrical *turret*, with broad and erect bracts below every whorl, and a pair of leaves at the base. Stem 3—12 inches high, branched chiefly from the base. Leaves oblong, obtuse, petiolate, and mostly entire. Corolla usually deep-violet. Filaments forked, the anther upon the inner prong. Calyx flattened. Plant scentless. 17. SELF-HEAL.
    - *b.* Flowers in broad terminal and 3-branched cymes, which are formed of many compact globular heads; every flower with a large ovate bract below it of the same colour as the corolla, both, while young, being of a deep red hue. Whole plant often of the same tinge. Stem 12—18 inches high, branched and panicled. Leaves ovate. 13. WILD MARJORAM.
    - *c. Leaves mostly radical*, or very nearly so, the petioles very long; blade *oblong-ovate, crenate*, and rounded at the end. Stem 1—3 feet high, solitary, simple, rigid, slender, with usually only two leaves unassociated with flowers, and which are situated above the middle. Lowest whorl of the head of flowers considerably below the upper whorls, and with a pair of sessile leaves beneath it. Plant rough with short coarse hairs. Flowers red, rarely white. 30. BETONY.

(COROLLA VERY IRREGULAR, and distinctly 2-LIPPED. Flowers RED, LILAC, BLUE, PURPLE, or WHITE. *Stamens four.* PLANT PERENNIAL.)

d. Stem leafy. Calyx-ribs 5 *or* 10.

Leaves ovate-cordate, coarsely serrated, and pointed, the lower ones on long petioles. Stem 2—3 feet high. Spikes pyramidal, tapering to a point. Flowers six in a whorl, dull red, the lower lip mottled. Plant hairy and fœtid.—(Fig. 143.) 34. COMMON HEDGE WOUND-WORT.

Leaves narrow-oblong, tapering, and nearly sessile. Plant 2—3 feet high, rough and hairy. Spikes *cylindrical;* flowers light-purple, 6—10 in a whorl. 35. LONG-LEAVED WOUND-WORT.

e. Stem leafy. Calyx-ribs 15. Leaves ovate, coarsely-serrate, petiolate, whitish underneath. Stem 2—3 feet high, branched, white with mealy down. Flowers small and whitish, dotted with crimson, the whorls crowded into dense spikes. Plant aromatic. 20. CAT-MINT.

6. Flowers *axillary*, either sessile, or in thin cymes upon long peduncles.

a. Flowers in loose and mostly unilateral cymes, upon forked peduncles longer than the leaves, every cyme containing 6—10. Corolla light purple. Plant erect, bushy, and downy. Leaves ovate, more or less serrated. 14. CALAMINT.

b. Flowers sessile, *in pairs,* (occasionally solitary or three together) and *unilateral.* Calyx 2-lipped.

Flowers *bright blue*, slender, and about an inch long. Plant 6—18 inches, bushy and scentless. Leaves ovate-lanceolate, nearly sessile, slightly toothed. Calyx closed after the fall of the corolla, resembling a box with the lid let down. 18. BLUE SKULL-CAP.

Flowers minute, dull purple or blueish. Plant 4—6 inches high. Leaves ovate, entire, or nearly so. Calyx as in the preceding. 19. SMALL SKULL-CAP.

Flowers large and handsome, *white*, blotched with rose-colour. Stem 12—18 inches high, erect, robust, and nearly simple. Leaves 1½—2 inches long, broadly elliptical, hairy and serrated. Calyx remaining open. 22. HONEY-BALM.

c. Flowers *sessile*, and *many to every whorl.*

* Corolla large and showy, an inch long, the upper lip vaulted.—Leaves 1—3 inches long, ovate-cordate, coarsely serrated, pointed, and petiolate. Stem square, curved and reclining at the base.

Flowers white, rarely tinged with pink, about 20 in a full whorl. *Anthers black.* Leaves wholly green. (Fig. 147.) 23. WHITE DEAD-NETTLE.

Flowers crimson, about 10 in a whorl. Anthers yellowish. Leaves usually with a white blotch. 24. SPOT-LEAVED DEAD-NETTLE.

(COROLLA VERY IRREGULAR, and distinctly 2-LIPPED. Flowers RED, BLUE, LILAC, PURPLE, or WHITE. *Stamens four.* PLANT PERENNIAL.)

** Corolla insignificant.

Plant 2—3 feet high, bushy and *fœtid.* Leaves ovate, wrinkled, crenate, and downy. Flowers abundant, dull purple, rarely white, the *upper lip concave.* 41. BALLOTA.

Plant 1—2 feet high, bushy and *aromatic.* Leaves ovate, wrinkled, serrate, and on long petioles. Flowers numerous, and white. *Upper lip almost flat.* 28. COMMON BALM.

C. *Stamens four. Plant annual.*

1. Long linear bracts interspersed among the flowers, which are collected into very dense hemispherical and distant whorls in the axils of the upper leaves, with an involucrum surrounding the whole. Plant 1—2 feet high, hairy, and straggling. Leaves ovate and slightly serrate. Petioles short. Calyx 13-ribbed. Corolla lively pink. 15. COMMON WILD-BASIL.

2. *Calyx distinctly 2-lipped.* Plant bushy, 3—8 inches high. Leaves narrow-ovate, about half an inch long, and slightly toothed. Flowers chiefly in axillary whorls of about six, purple, the lower lip variegated with white and violet. 16. BASIL-THYME.

3. *Calyx 5-toothed. Lower lip of the corolla 2-cleft,* with 1—2 teeth at the base on each side. Pollen the colour of red-lead. Flowers reddish, rarely white.

   a. Upper leaves crowded, with flowers intermingled, into a terminal and pyramidal head. Stem 3—12 inches high, square, hollow, and nearly glabrous. Leaves triangular, serrated, pointed, and downy. Whole plant often tinged with red. Odour unpleasant. 25. COMMON RED DEAD-NETTLE.

   b. Upper leaves 5-lobed, crenate, closely sessile, and stem-clasping. Lower ones on very long petioles, and obtusely crenate. Internodes very long. Flowers axillary and insignificant. 26. HENBIT.

4. *Calyx 5-toothed. Lower lip of the corolla 3-lobed.*

   a. Lateral lobes of the lower lip eventually reflexed. Plant 6—12 inches high. Leaves ovate and petiolate. Flowers in whorls of six. Corolla scarcely longer than the calyx. 36. CORNFIELD STACHYS.

   b. Lower lip of the corolla *spreading.* Plant scentless. Whorls of flowers collected into loose pyramidal heads.

   Plant 1—3 feet high, branchy, rough with reflexed or spreading bristles. Internodes remarkably swollen at the upper part. Leaves ovate, serrate, pointed, hairy, and petiolate. Flowers inconspicuous, red or white, the lower lip a little freckled. Calyx-teeth prolonged into pungent prickles. 32. COMMON HEMP-NETTLE.

   Plant 12—18 inches high, not much branched. Hairs short and soft. Internodes not swollen. Flowers purple, mottled with crimson. 30. RED HEMP-NETTLE.

HABITATS AND DISTRIBUTION.

1. Spear-mint—*Men'tha vi'ridis.*

Marshy places, and on the margins of slow and shallow streams and rivers; rare, and probably of garden origin, though remotely so, being of universal and very ancient cultivation. Fl. August.

E. B. xxxiv. 2424.

2. Pennyroyal—*Men'tha Pulé'gium.*

Wet and sandy commons, and on the borders of rivulets, where the soil is light. Generally distributed, but nowhere in plenty. Fl. end of summer.

E. B. xv. 1026.

Common in gardens, especially those of cottages.

3. Peppermint—*Men'tha piperi'ta.*

Wet ditch-banks, and other watery and swampy places; rare, and like spear-mint, probably in every case of garden origin. Fl. August, September.

E. B. x. 687.

4. Round-leaved Mint—*Men'tha rotundifo'lia.*

Wet places, on the borders of ponds and swamps; generally distributed, but rare. Fl. August, September.

E. B. vii. 446.

5. Horse-mint—*Men'tha sylves'tris.*

Waste wet places, such as ditch-banks and the borders of swamps; rather rare, and found chiefly in the south. Fl. August, September.

E. B. x. 686.

6. Common Water Mint—*Men'tha hirsu'ta.*

Shallow ditches, and on the borders of ponds and marshes; abundant everywhere. Fl. August, September.

Curtis, iv. 623; E. B. vii. 447; Baxter, v. 398.

The commonest of the British mints, growing in large patches, often amid reeds and rushes, with stems 1—2 feet high, and in its ordinary state well distinguished by the downy softness of its herbage, and its handsome whorls of lilac flowers, which towards the summit of the stem are crowded into globular heads. The foliage, while young, is often purple. The odour varies considerably, in some cases becoming camphorated, like peppermint; in others, acquiring the peculiar sweetness of basil. A well-marked and perfectly glabrous variety, distinguished as Bergamot Mint, and formerly as *Men'tha citra'ta* and *Men'tha odora'ta* (E. B. xv. 1025.) yields the scent of the Bergamot orange, and for the sake of its agreeable perfume is much cultivated in gardens. The name of Bergamot is also applied to the *Monar'da did'yma*, a handsome exotic of the flower-garden, which must not be confounded with the plant before us. Another variety, with the leaves much curled at the edges, is described in E. B. Supp. ii. 2785, under the name of *Men'tha cris'pa.*

7. WHORLED WATER MINT—*Men'tha sati'va.*

In the same class of habitats as the common water-mint, and equally general, though not so plentiful. Fl. August, September.

E. B. vii. 448.

The *Men'tha acutifo'lia* of E. B. xxxiv. 2415 appears to be indistinguishable from this, and both plants are in all likelihood only forms of the *hirsu'ta.*

8. CORNFIELD MINT—*Men'tha arven'sis.*

Cornfields, and low, moist meadows; extremely common, except in the north of Scotland. Fl. June—September.

E. B. xxx. 2119.

A very variable species, yet generally distinguishable without difficulty. The following do not differ by any permanently appreciable characters:—

Men'tha gra'cilis. (E. B. vii. 449, as *M. gen'tilis.*)
——— *ru'bra.* (E. B. xx. 1413.)
——— *gen'tilis.* (E. B. xxx. 2118.)
——— *agres'tis.* (E. B. xxx. 2120.)

For descriptions of these latter, the synonyms, and much other information respecting the British mints, see Smith's English Flora, vol. iii. Like *Ru'bus* and *Ro'sa, Sa'lix* and *Hiera'cium*, the genus *Men'tha* in ingenious hands, allows of almost endless disintegration. The older writers on British Botany made out of it nearly forty distinct forms.

9. GIPSY-WORT—*Ly'copus Europæ'us.*

Banks of rivers and ditches, and on the borders of pools; common, except in Scotland. Fl. June—September.

Curtis, i. 147; E. B. xvi. 1105; Baxter, iii. 167.

10. VERVAIN SALVIA—*Sal'via Verbena'ca.*

Dry waste places and by roadsides, sometimes on slopes of dry hills, and upon earthy and bush-clad rocks, especially near the sea, and always preferring limestone or gravel; tolerably common, but much more so in the southern counties than in the north. In Scotland only found near Edinburgh. Fl. May—October.

Curtis, ii. 365; E. B. iii. 154.

The whorls of flowers are horizontal and perfectly flat, and with considerable lengths of stem between them, a peculiarity still more noticeable when the seeds are ripe. The "*Sal'via clandesti'na,*" published in the Flora of Jersey and Guernsey, and the *Sal'via oblonga'ta*, also found in those islands, appear to be only slight varieties of the *Verbena'ca.*

11. BLUE MEADOW SALVIA—*Sal'via praten'sis.*

Dry pastures and about hedges; very rare, and said to be found only near Cobham in Kent, and in Surrey, Sussex, and Oxfordshire. Fl. July.

E. B. iii. 153; Baxter, i. 65.

12. WILD THYME—*Thy'mus Serpyl'lum.*

Dry heaths and commons, sunny hedgebanks and waste places, and especially upon green slopes of short and elastic pasture near the sea; abundant in every part of Great Britain, though in special districts, as the neighbourhood of Manchester, almost unknown. Fl. July—Oct.

Curtis, i. 120; E. B. xxii. 1514; Baxter, ii. 177.

When in autumn the wild thyme strews its purple over the hills, mingling with the yellow furze, the pictorial effect is scarcely inferior to that of the heather. Individuals that get entangled with it often rise 12 inches high. The prettiest form of the plant is when it swells into those little knolls and bloomy cushions that show the lightness of the soil beneath. Near the sea the little ant-hills are completely covered with its flowery branches. A variety, not rare, and often cultivated upon rockeries, has the whole surface covered with short and whitish hairs. Another has the flowers white; and a third is universal in kitchen-gardens as "Lemon-thyme."

13. WILD MARJORAM—*Orig'anum vulga're.*

Dry bushy places, chiefly upon limestone and gravel; sometimes upon earthy cliffs, and by waysides, loving sunshine and a pure atmosphere. Common. Fl. July—September.

Curtis, ii. 331; E. B. xvi. 1143; Baxter, v. 354.

A very interesting plant, with the flowers sometimes white.

14. CALAMINT—*Calamin'tha officina'lis.*

Dry hedgebanks and waysides, in dry woods, and upon earthy cliffs, chiefly upon limestone and gravel; common, except in Scotland. Fl. July, August.

Like many other plants of this very difficult and perplexing family, Calamint presents itself under two or three distinct forms, which we may call either species or varieties.

The commonest is that figured in Curtis, ii. 404. as *Melis'sa Nep'eta;* in E. B. xx. 1414, as *Thy'mus Nep'eta;* and in Baxter, vi. 486, as *Calamin'tha Nep'eta.* The leaves of this are about half an inch long, and nearly entire, and the calyx is fully two-thirds the length of the corolla. In some parts of Kent and Essex it covers many acres of ground, constituting the sole herbage, excepting where grass is intermingled.

The second form is that formerly known as *Thy'mus Calamin'tha,* and figured under that name in E. B. (xxiv. 1676.) The leaves are larger than those of the *Nep'eta,* and more decidedly serrated, and the corolla is nearly twice as long as the calyx. Though widely diffused, it is a rather rare plant.

Thirdly, there is the "*Calamin'tha sylvat'ica.*" (E. B. Supp. iv. 2897.) This is a still larger form, the leaves often attaining the length of the little finger, while the showy flowers often measure an inch, and are borne in large and open cymes. The Isle of Wight is the only locality at present known for it, as regards Great Britain.

15. Common Wild-basil—*Clinopo'dium vulga're.*

Dry hedgebanks, especially such as lie sunwards; waste green borders of roads that slope to the south; sometimes in warm dry woods, and upon rocks, always flourishing most upon limestone. Common. Fl. July—September.

E. B. xx. 1401; Baxter, v. 346.

Occasionally with the flowers white, and at all times a very interesting plant, especially in the convex whorls of withered calyces, so ingeniously alluded to in the name.

16. Basil-thyme—*A'cinos vulga'ris.*

Dry, sandy and gravelly fields, waste places, waysides, and upon earthy cliffs and rocks, especially where the soil is calcareous; common, except in Scotland. Fl. July, August, Annual.

Curtis, i. 43; E. B. vi. 411 (both as *Thy'mus A'cinos*); Baxter, vi. 479.

17. Self-heal—*Prunel'la vulga'ris.*

Moist waysides; moist fields, where the soil is clayey, and even upon dry walls: abundant everywhere. Fl. June—October.

Curtis, ii. 262; E. B. xiv. 961; Baxter, i. 67.

Distinguished in an instant by its unique and beautiful turrets, solitary upon the summit of the stems and branches, with rarely more than two or three of their violet-coloured corollas open at once, so that the plant always seems either just beginning to bloom or just finishing. When the flowers fade, the lips of the calyx draw together, and shut up the seeds till they become ripe. Individuals occur with white flowers, and rather more frequently with pink ones.

18. Blue Skull-cap—*Scutella'ria galericula'ta.*

Wet ditch-banks and the rushy borders of ponds and meres, mingled with the semi-aquatic Galiums, and other plants that love plenty of moisture about their roots; very common. Fl. June—August.

Curtis, i. 181; E. B. viii. 523 (too red); Baxter, i. 12.

Well marked by its pairs of large, pretty blue flowers, in the axils of the principal leaves, and all pointing one way.

19. Small Skull-cap—*Scutella'ria mi'nor.*

Heathy moors, and boggy places, especially where the soil contains much gravel; rather rare, and in the eastern counties and in eastern Scotland much more so. Fl. July, August.

Curtis, ii. 263; E. B, viii. 524.

20. Cat-mint—*Nep'eta Cata'ria.*

Dry banks and waysides, principally upon gravel and chalk. Not uncommon in the southern and midland counties, but becoming rare further north. In Ireland not uncommon. Fl. July.

E. B. ii. 137; Baxter, v. 378.

21. GROUND-IVY—*Glecho'ma hedera'cea.*

Dry hedgebanks; common everywhere. Fl. April, May.

Curtis, i. 117; E. B. xii. 853; Baxter, ii. 136.

An elegant little plant, recognised in early spring, not sooner by the deep violet-blue of its flowers, heart-shaped and crenate leaves, and long and straggling stems, than by its powerful and rather unpleasant odour. It may always be known by its anthers, which are curved, and placed back to back, so as to present the figure of two pairs of little white semi-circles, thus:—)( )(The blossoms vary to white.

22. HONEY-BALM—*Melit'tis Melissophyl'lum.*

Dry banks and on the borders of woods; rare, and almost confined to the extreme south and south-west of England. The New Forest. Devonshire. Fl. May, June.

E. B. ix. 577; Baxter, iv. 285.

The *Melit'tis grandiflo'ra* of E. B. ix. 636, figured in Curtis (ii. 403.) under the name of *Melil'tis Melissophyl'lum,* differs only in unimportant particulars. The leaves are a little larger, and the lower lip of the corolla is more highly coloured.

23. WHITE DEAD-NETTLE—*La'mium al'bum.*

Hedgebanks, by waysides, and on the borders of dry fields; common. Fl. principally in April and May, but more or less all through the year, and in fine seasons, luxuriantly at Christmas.

Curtis, i. 118; E. B. xi. 768; Baxter, i. 31.

Remarkable for its black anthers.

24. SPOT-LEAVED DEAD-NETTLE—*La'mium macula'tum.*

Dry banks and by waysides, in sheltered situations; rare, and almost certainly a naturalised plant, being extremely common in gardens, especially old-fashioned ones, and a very favourite flower for rockeries. Fl. chiefly in the spring, but more or less at all seasons.

E. B. xxxvi. 2550.

25. COMMON RED DEAD-NETTLE—*La'mium purpu'reum.*

Waysides and on the borders of ploughed fields, and in kitchen gardens; a common weed everywhere, commencing to bloom in February, and continuing, more or less, till the close of autumn.—Annual.

Curtis, i. 42; E. B. xi. 769.

Occasionally with the blossoms white.

A tolerably well-marked variety, with the leaves deeply cut, is usually distinguished as *La'mium inci'sum.* (E. B. xxvii. 1933.)

26. HENBIT—*La'mium amplexicau'le.*

In cultivated ground, as a weed, and in dry and sandy fields; common. Fl. May, June. Annual.

Curtis, i. 119; E. B. xi. 770.

leaves like those of betony, and bright blue corollas immense for the size of the plant. *Sal'via* supplies many magnificent species, as *Sal'via pa'tens,* the superb deep-blue flowers of which are in autumn unsurpassed; and *Sal'via splen'dens* and *formo'sa,* the Mexican and Peruvian scarlets, which endure until cut down by the frost. *Sal'via ful'gens* is known by its green calyx; in *Sal'via splen'dens* the calyx is of similar colour to the corolla. The plants called "clary" belong to the same genus, and are distinguished by the large red or purple bracts which terminate the long and erect racemes of trifling flowers. The other common Labiates comprise *La'miums* in several kinds; *Beton'ica grandiflo'ra,* a plant like the wild *officina'lis,* but very much larger; "Balm-of-Gilead" or *Cedronel'la triphyl'la,* the leaves of which, when bruised, yield the odour of citron; Molucca-balm or *Moluccel'la læ'vis,* (xliii. 1852.) remarkable for the enormous size of the cup-shaped and expanded calyx; *Amethys'tea cæru'lea,* (li. 2448.) a pretty blue-flowered annual with tripartite leaves; *Ziziph'oras,* (xxiii, 906, xxvii. 1093.) neat little thyme-like plants with only two stamens; *Collinso'nias,* (xxx. 1213.) beautiful perennials with large leafy panicles of white flowers, the lower lip elegantly fimbriated, and the stamens long and protruding; *Prunel'la grandiflo'ra,* (xlv. 2014.) like the *vulga'ris* on a greater scale; *Sta'chys coccin'ea,* (xviii. 666.) and now the inordinately favourite *Peril'la Nankinen'sis.* The deep purplish-red foliage of this plant renders it inestimable for "ribbons" and as a foil to the bright hues of geraniums and Calceolarias. Associated with it may very commonly be found variegated varieties of Balm. In the greenhouse the most conspicuous Labiates are the *Co'leus Blu'mei* and *Verschaffel'ti.* The former has a red blotch upon every one of its ovate, serrate, pointed, and yellowish leaves; the latter is of an almost uniform deep-mulberry-brown. The blue flowers grow in erect and slender spikes 6—8 inches in length. In the allied genus *Plectran'thus,* the corolla is formed like that of *Lami'um,* but inverted, the lowermost portion being canoe-shaped, and protecting the declinate stamens. *P. Forskoh'leæ* (xlvi. 2036.) from Abyssinia and Arabia Felix, has distant whorls of lilac-blue flowers. *Sal'via confertiflo'ra* (lxviii. 3899.) is a beautiful Brazilian stove plant, with spikes 18 inches long, consisting of innumerable scarlet and white flowers, not very much longer than the calyx. *Leono'tis Leonu'rus* (xiv. 478.) is a rare plant with pretty scarlet flowers. *Westring'ias* (lxi. 3308.) are New Holland shrubs, with the aspect of rosemary. *Lavan'dula pinna'ta* (xii. 401.) is a very interesting little lavander with the leaves deeply pinnatifid. *Gardo'quias,* (lxvi. 3772.) *Physoste'gias,* (lxii. 3386, lxiii. 3494.) *Prostanthe'ras,* and several more may also be met with, but not commonly. The microscopist should never fail to examine the leaves and calyx of a Labiate new to him, especially if aromatic, as the probabilities are of novel and pretty displays of oil-glands.

CIII. THE VERBENA FAMILY.—*Verbena'ceæ.*

The Verbenaceæ are mostly trees or shrubs, herbaceous plants being quite in the minority. They belong to the tropics of both hemispheres, and to the temperate parts of South America, and have a few scattered representatives in Europe, including the solitary British species, called vervain. A very small amount of external similarity is found among them, and scarcely any character can be named by which they may be readily identified. Technically, they are most like the *Labia'tæ*, from which they differ, like the *Ehretia'ceæ*, in having their two or four little seed-like fruits coherent instead of detached; and in being destitute, usually, of aromatic oil-bags upon the leaves, though the common lemon-scented Verbena, or *Aloy'sia citriodo'ra*, has foliage quite as fragrant as that of bergamot. They bear no resemblance to the *Labia'tæ* in regard to their flowers, the corolla consisting of a very long and slender tube, with an irregular, flat or concave, and 5-lobed limb. The stamens are usually four, and then didynamous; sometimes only two. The leaves and the inflorescence vary considerably, the latter being either simple and undivided, or deeply pinnatifid; while the flowers are borne either in opposite corymbs, compact heads, or slender spikes, and seldom or never in regular whorls like those of Labiates. A further, though very minute distinction, as regards the Labiates, is found in the style, which in the Verbenaceæ proceeds from the summit of the ovary, instead of, as in the former family, from the base.

One species British.

Stems erect, 18—24 inches high. Branches spreading, slender, and exceedingly tough. Lower leaves obovate in outline, coarsely pinnatifid; upper ones lanceolate and sessile. Flowers small and unattractive, pale lilac, and thinly disposed in slender spikes of 3—6 inches in length. Perennial.

COMMON VERVAIN.

HABITATS AND DISTRIBUTION.

COMMON VERVAIN—*Verbe'na officina'lis.*

Dry waste ground, and upon earthy and crumbling cliffs, preferring limestone. Often by stony waysides on the outskirts of villages. In England not rare. Sparingly in Ireland, though plentiful near Cork and Killarney. In Scotland seldom seen. Fl. July.

Curtis, i. 41; E. B. xi. 767; Baxter, i. 26.

Verbena is a name of immemorial antiquity, and was originally applied to a plant esteemed in magic. Medea used Verbena when she gave youth again to Æson; the priests bound it about their temples on the morning of the death of Æneas.

The gay autumnal garden flower called "Verbena" is the *V. Melin'dres* or *chamædrifo'lia*, a native of the neighbourhood of Buenos Ayres. The various colours it assumes render it a general favourite, as there is scarcely any contrast, except yellow, that it will not supply, when it is desired to have a mass all of one hue. *Verbe'na veno'sa* and several others of similar habit to the *Melin'dres* are in occasional cultivation; *Verbe'na teucrioi'des* from Monte Video, has purple flowers, with the odour of jasmine. Indoors the favourite genera are *Lanta'na* and *Cleroden'dron*. The flowers of the former are borne in little umbels or hemispherical heads on the summit of long peduncles, every head, while young, an inch or two across. Their colours are exceedingly pretty and delicate, and two or more often mingle in the same head, as lilac and primrose in the *Lanta'na mutab'ilis*. (Bot. Mag. lviii. 3110.) In the *Lanta'na cro'cea* the heads are of a fine rich orange colour. Unfortunately the odour of these flowers is like that of lucifer-matches, and the plants, which form small bushes or undershrubs, are apt to be of an untidy habit of growth, and in some species a little prickly. *Cleroden'drons* are shrubs and small trees, usually of captivating beauty. The leaves are usually lanceolate or ovate; the stamens of the panicled and often richly-tufted flowers are long and projecting, and there is not infrequently a striking contrast in the colour of the calyx and corolla, the former being white, while the petals are richly dyed. Besides this, they have in some cases, a spicy odour like that of the Gardenia, though not so delicate. Two of the most splendid are the *Cleroden'dron Bethunea'num* from Borneo, (Bot. Mag. lxxv. 4485.) in which the whole panicle is deep scarlet, and the *Cleroden'dron splen'dens* from Sierra Leone, also scarlet. *C. sinua'tum* from the same country, (lxxii. 4255.) and the Indian *C. hasta'tum*, the tube of which is 4—5 inches long, have white flowers. In *C. macrophyl'lum* (lii. 2536.) they are blue and white; and in the *C. Thomso'næ*, a slender climbing shrub, they are crimson and white. Of miscellaneous ornamental plants, the following are the most esteemed:—*Duran'ta Plumie'rii* and *D. Ellis'ia*, green-house under-shrubs with lanceolate leaves and spikes of blue flowers; *Cassel'ia integrifo'lia*, a Brazilian plant with handsome purple flowers; *Callicar'pa Americа'na*, (Catesby's "Carolina," ii. 47.) very pretty in its clusters of violet berries; *Ægiph'ila grandiflo'ra* (Bot. Mag. lxxii. 4230.) from Havana, a plant with whorled and oblong leaves, and fine yellow flowers in terminal corymbs; and *Petre'a volu'bilis*, (xvii. 628.) a blue-flowered climber from Vera Cruz. *Spielman'nia Africa'na* (xliv. 1899.) is a Cape shrub with solitary and axillary white flowers; *Stachytarphe'ta mutab'ilis* and *arista'ta* (xxv. 976, lxxii. 4211.) have handsome spikes of rose or orange-coloured blossoms. The Lemon Verbena or *Aloy'sia*, named above, is a native of Chili. Though in the colder parts of England an indoor shrub, in the south of Devonshire and in the Island of Guernsey it becomes tree-like, and has long pendulous branches. The insignificant white or lilac flowers grow in erect panicles; the lanceolate leaves, as in many other Chilian plants, are produced in whorls of three. Hence the original name of *Verbe'na triphyl'la*.—(Bot. Mag xi. 367.)

To this family belong also the celebrated Tree-of-Chastity or *Vi'tex Agnus-Castus*, and the invaluable Teak-tree or *Tecto'na gran'dis*, the oak of the East Indies. The latter is an enormous forest-tree of Malabar, Pegu, and the Burman Empire, producing leaves 1—2 feet long, and panicles of small white flowers. The *Agnus-Castus* is a shrub growing 5—10 feet high, native of the shores of the Mediterranean. The leaves are opposite, 6—7-lobed, entire or nearly so, and hoary beneath. The small white or faintly blue or rose-tinted flowers appear towards September in whorled and compound terminal spikes 7—15 inches long. When dried, the leaves are powerfully aromatic, and in this state were once highly esteemed for a fancied virtue.

CIV. THE FOXGLOVE FAMILY.—*Scrofularia'ceæ.*

The plants of which the foxglove is the type constitute one of the largest and most widely diffused families known to Botany. The species amount to nearly 2,000, and are found everywhere from Melville Island to Southern India; no country is too hot, or too cold, or too ungenial for them. They are mostly herbaceous, though in a few cases under-shrubby and even tree-like; usually scentless, but occasionally, as in the Scrofularia, fœtid, or, as in the musk-plant, aromatic. In properties they are acrid, purgative, and emetic, many having the secretions so highly concentrated, as happens with the *Digita'lis*, that they become valuable in the hands of the physician. Structurally they are characterised as follows:—

Leaves either scattered, opposite, or whorled; simple, and either undivided, or more or less deeply lobed or pinnatifid. Flowers most usually in panicles or spikes, sometimes in erect racemes, occasionally solitary and axillary. Calyx of four or five sepals, which are more or less united, and often unequal, the upper sepal being the largest, and the two lateral ones the smallest. Corolla of four or five petals, either slightly united at the base, or completely, into a tubular form, and always more or less irregular. Stamens attached to the inner surface of the corolla, usually four and didynamous; sometimes only two, but with the rudiments of the deficient pair alongside of them; occasionally five, and then either all perfect, or one without the anther. Filaments often much bent; anthers usually free and far apart; often very large, and with the cells diverging; sometimes, as in *Tore'nia* and *Melampy'rum*, coherent. Ovary solitary and perfectly free; style usually long and conspicuous; stigma often large, and sometimes 2-lipped and sensitive. Fruit a 2-celled capsule, which opens when ripe, by little valves, and allows the usually abundant seeds to fall to the ground.

In connection with these plants there are several matters deserving special notice. In no other family are there so many varieties of the irregular corolla, and after those of the Orchids, none are more quaint. Such are the "pocket-like," well-known in the Calceolaria; and the "personate" or mouth-like, in the snapdragon, which, by gentle pres
sure at the sides, opens and closes like the muzzle of a
The portion of the latter which represents the lips
the "palate." In some varieties the oddity is
sence of a long tail, as in the *Lina'rias;* or by th
reflexed, as in the genus *Dip'lacus.* The tenden

become regular, by the development of additional parts, is a peculiarity of still greater interest. Many of the Linarias, and especially the common yellow one, have been observed in a perfectly symmetrical condition; and it is not uncommon to find the terminal corolla of a foxglove erect, shaped like the bowl of an acorn, and with five recumbent stamens of equal length. These occasional conditions are called by the strange name of "*peloria*," literally "monsters," the fact being that they are disclosures of the latent exogenous archetype, and comparable with perfect things instead of unnatural ones. A third peculiarity of the family is the aptitude not uncommonly met with, to produce hybrids by cross-impregnation. Examples are frequent in wild nature, and the gardener takes advantage of it to procure new varieties of certain exotics. No plant offers greater facilities for artificial hybridising than the Calceolaria, the stigma being well developed before the pollen is mature, and the anthers allowing of safe removal and application. Lastly, in the group of species of which *Rhinan'thus* is the type, there appears to be a certain amount of parasitism, rendering them injurious to the meadows and pastures in which they abound.

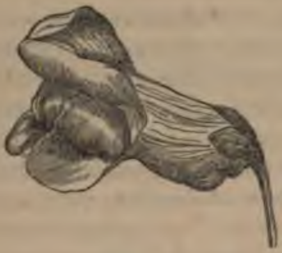

Fig. 148.
Personate corolla of Snapdragon.

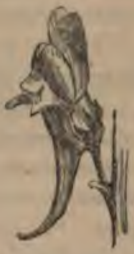

Fig. 149.
Personate and tailed corolla of *Lina'ria*.

The flowers of this large family are generally handsome, and often of vivid colours, though there are plenty that make no show. Two or more colours often meet in the same corolla, giving them, as in the monkey-flower, an extremely gay appearance. They are rarely endowed with odour, and examples of their becoming double are unknown. The anthers are often hairy, and supply beautiful objects for the binocular microscope, as do the seeds also in *Neme'sia* and many others.

In Britain there grow wild, or have become naturalised, fifty-three. Others seem disposed to settle here, as the common musk-plant, which springs up on wayside rubbish, and even the comparatively new

Veron'ica Lindleya'na, which makes itself quite at home in plantations. They are conveniently resolved into—

Species with two stamens (the genus *Veron'ica.)*
Species with didynamous stamens.
Species with five stamens (the genus *Verbas'cum.*)

SECTION I.

Stamens two, equal in length, and generally divergent. Corolla of four petals, slightly coherent at the base; the lowermost petal the smallest, the upper one the largest, and the lateral ones equal in size. Ovary compressed and many-seeded. Leaves opposite. Flowers blue, pinkish, or white, (never yellow) with dark streaks radiating from the centre. *(Speedwells.)*

- A. *Flowers all solitary and axillary.* Leaves uniform in shape. Plant annual.
  - 1. Sepals cordate at the base. Leaves broad, 5—7-lobed, the margin entire, and the central lobe the largest. Stems procumbent, 2—18 inches long, and with many branches. Corolla minute, light purplish-blue. Capsule 2—4-seeded. 11. Ivy-leaved Speedwell.
  - 2. Sepals ovate or lanceolate. Leaves cordate or ovate, and serrated. Capsule many-seeded.
    - *a.* Corolla vivid blue, large and showy. Capsule nearly twice as broad as long, compressed and sharply keeled. Stems and branches 6—12 inches long and mostly procumbent. Leaves petiolate. 14. Buxbaum's Speedwell.
    - *b.* Corolla usually minute, pale blueish, pinkish, or white. Capsules scarcely broader than long.
      - Sepals oblong. Plant green. Seeds about six in each cell. Lowermost petal white. 12. Green Field Speedwell.
      - Sepals broadly ovate and acute. Plant grayish. Seeds 8—12 in each cell. Flowers wholly blue. 13. Gray Field Speedwell.
- B. *Flowers in lateral, axillary, and leafless racemes.*
  - 1. Plant glabrous.
    - *a.* Racemes *alternate.* Leaves linear, entire or slightly toothed. Pedicels divaricated, and increasingly so as the capsules ripen. Flowers few and pale. Capsule large, flat, and circular. Plant 1—2 feet high, lax and spreading, slender and elegant. 5. Narrow-leaved Bog Speedwell.
    - *b.* Racemes *opposite.* Plant succulent.
      - Stem erect. Leaves lanceolate, pointed, and serrate. Racemes long and acute. Flowers numerous, small, pink or blueish. 6. Great Water Speedwell.
      - Stem procumbent, rooting at the joints. Leaves elliptical, or oval, obtuse, variously and bluntly serrated. Flowers large and showy, deep and vivid blue, or occasionally light pink. Whole plant deep green, shining, and succulent 7. Brooklime.
  - 2. Plant more or less hairy.
    - *a.* Leaves *linear;* pedicels much divaricated. Capsule large, flat, and circular. 5. Narrow-leaved Bog Speedwell.

(STAMENS TWO. *Flowers in lateral, axillary, and leafless racemes.* Plant hairy.)

b. Leaves *broadly-ovate, sessile*, pointed, serrate, wrinkled, and rugged. Internodes with opposite and vertical lines of hairs. Racemes pointed, and rising higher than the topmost leaves. Flowers bright azure, large, very showy and conspicuous. Capsule obovate, shorter than the calyx. Plant 6—12 inches high. 9. GERMANDER SPEEDWELL.

c. Leaves *broadly-ovate, petiolate*, pointed, and serrate.

Racemes compact, spike-like and many-flowered. Stems 6—18 inches long, procumbent and creeping. Capsule obovate.—Whole plant roughish with short hairs. Flowers small, pale-blue. 8. MEDICINAL-TEA SPEEDWELL.

Racemes very lax, straggling and few-flowered. Leaves thin.—Corolla pale and insignificant. Capsule large, perfectly flat, formed as it were of two circular and dilated cells, and much larger than the calyx. 10. PALE SYLVAN SPEEDWELL.

C. *Flowers in erect terminal spikes* or corymbose clusters, the numerous upper leaves usually reduced to bracts.

a. Lower leaves deeply divided and almost pinnatifid, the terminal lobe larger than the others. Upper leaves mostly lanceolate and undivided. Stems erect, 1—4 inches high. Peduncles shorter than the calyx. *Plant annual.* 17. LITTLE VERNAL SPEEDWELL.

b. Upper leaves deeply cut into obtuse, finger-like segments. Stems 3—4 inches high, with decumbent branches. Peduncles longer than the calyx. Flowers deep rich blue. Annual. 16. CUT-LEAVED SPEEDWELL.

c. Leaves neither cut nor lobed, though usually more or less serrate.

Stem simple, 4—12 inches high, and terminating in a long, handsome spike of bright blue flowers. Leaves obovate, bluntly serrated about the middle only. 1. GREAT ROCK SPEEDWELL.

Flowers insignificant, blueish gray with dark veins, or sometimes flesh-coloured. Leaves broadly-ovate, sessile, nearly entire, glabrous, and very obtuse. Stamens hardly longer than the corolla. Spikes erect and solitary. Stems procumbent at the base. 2. THYME-LEAVED SPEEDWELL.

Leaves ovate or cordate, sessile, serrated, pointed, and hairy.—Flowers small, blue, almost concealed among the upper leaves, which are reduced to lanceolate bracteas. Plant usually 3—6 inches high, branched at the base, sometimes less so, and then much taller. 15. SPIKED FIELD SPEEDWELL.

Leaves elliptical, serrated about the middle. Stems slender, woody, and spreading. Flowers in corymbose clusters of 3—6, brilliant blue, pink at the mouth, large and very handsome. 4. PROCUMBENT ROCK SPEEDWELL.

Leaves ovate, either entire or deeply serrated. Stem about four inches high, simple, except at the very base. Flowers 6—10 together, small, but bright blue. 3. ALPINE SPEEDWELL.

SECTION II.

STAMENS FOUR AND DIDYNAMOUS; the anthers all perfect, and in some cases unite by their edges.

1. *Flower-stalks radical and leafless,* shorter than the petioles of the lanceolat oval leaves, which, including the disproportionately small lamina, are abou three inches in length. Corolla white or pinkish. 45. LIMOSELLA.
2. *Leaves* (excepting sometimes a few of the radical ones) *doubly-pinnatifid,* t lobes toothed and cut. Flowers solitary in the axils of the upper leaves.- Calyx 5-cleft and inflated. Corolla rose-coloured or white, the upper li compressed vertically, the lower one flat and 3-lobed. Plant light an tender green.
    - *a.* Branches numerous, simple, 4—12 inches long, and *prostrate upo the ground;* the principal or central stem erect, but not more tha 1—3 inches high. Calyx glabrous. 28. COMMON RED-RATTLE.
    - *b.* Plant *wholly erect,* 1—2—3 feet high, much branched, and in for pyramidal, the branches tinged with purple. Calyx downy. 27. TALL MARSH RED-RATTLE.
3. *Leaves all in opposite pairs.* Flowers *axillary,* one or two together, never i heads or panicles. Corolla yellow or whitish.
    - *a.* Anthers unconnected. Stems 1—3 feet high, creeping at the bas Leaves roundish-ovate, the lower ones petiolate, the upper on sessile. Calyx prismatic. Corolla gaping, the margins of the upp lip reflexed. Seeds numerous. 47. YELLOW MIMULUS.
    - *b.* Anthers coherent. Branches very slender, opposite, horizontal, an straggling. Leaves lanceolate, acuminate, 1½—2 inches long. Coroll tubular, the upper lip flattened vertically. Capsule with one or tw seeds resembling grains of wheat. Pairs of flowers unilateral.
        - Corolla *closed,* the lower lip prominent and straight. Upper leav usually pectinate at the base. 23. COMMON SYLVAN COWS'-WHEA
        - Corolla *gaping,* the lower lip deflexed. Leaves generally a quite entire. 24. ALPINE COWS'-WHEAT.
4. *Leaves all in opposite pairs.* Flowers in *panicles.* Corolla globular, not larg than a pea.
    - * *Corolla yellow.* Leaves cordate, doubly-serrate, petiolate, and down Panicles axillary and leafy. Stem 18—24 inches high. Folia remarkably bright green. 32. YELLOW FIG-WORT.
    - ** *Corolla brownish or greenish-red;* occasionally, but rarely, milk-whit Stem four-cornered. Leaves petiolate. Plant with the smell elder when bruised.
        - *a.* Leaves downy and wrinkled, cordate-triangular, with large doub serratures; stems downy, 2—3 feet high. 31. DOWNY FIG-WO
        - *b.* Leaves glabrous.
            - Leaves long heart-shaped, triangular, and pointed; ste with four acute angles; panicles many-flowered; ro beset while young with fleshy knobs. Plant with purplish-brown tinge. 29. COMMON FIG-WORT.
            - Leaves ovate-oblong and obtuse; stem winged at the fo angles; panicles few-flowered; root wholly fibrou Plant clear green. 30. GREAT FIG-WORT.

(STAMENS FOUR and DIDYNAMOUS.)

5. *Leaves all in opposite pairs.* Flowers in *spikes* or compact heads.

- Leaves serrate.
  - Stems 3—12—24 inches hight erect, square, not much branched, and often speckled with purple. Leaves lanceolate, veined on the under surface. Flowers in short, lax, leafy heads. Calyx inflated. Corolla yellow, blueish at the tip, and nearly closed. Seeds brown, thin, flat, and usually with a broad membranous wing. Whole plant glabrous. 22. COMMON YELLOW-RATTLE.
  - Stem quite simple, 4—8 inches high. Root creeping. Leaves ovate or cordate, decussated, and less than an inch long. Flowers in dense terminal spikes, vivid purplish-blue. Bracts numerous and purplish. 20. PURPLE ALPINE BARTSIA.

** Leaves entire. Flowers in terminal spikes, almost concealed by numerous large and coloured bracts. Anthers coherent. Seeds one or two in each cell, and resembling grains of wheat. Stem leafy, with wide-spreading branches. Leaves linear or lanceolate, 1½—2 inches long.

- Spikes conical. Bracts lax, lanceolate, pinnatifid, and purplish rose-colour. Segments of the calyx linear, longer than the tube, and coloured like the bracts. Corolla yellow, variegated with rose-colour and purple. 26. PURPLE COWS'-WHEAT.
- Spikes four-sided. Bracts cordate, finely pectinated, purplish, with green points, and closely imbricated. Corolla variegated with cream-colour and light-purple, the palate yellow. 25. CRESTED COWS'-WHEAT.

6. *Leaves alternate and scattered*, or at least at the upper part of the plant; the lower ones sometimes opposite or irregularly whorled. *Corolla personate*, and usually closed by the prominent palate.

A. Stems always trailing or pendulous. Leaves broad. Flowers small, axillary and solitary, blue or lilac and yellow.

- Leaves cordate, 5-lobed, petiolate, purple on the under surface; stems and branches thread-like, very numerous, and hanging against old walls so as to form light and shining curtains of foliage 1—3 feet in depth. Whole plant perfectly glabrous. 42. IVY-LEAVED TOAD-FLAX.
- Leaves ovate, downy, and usually entire. Plant hairy, trailing upon the ground. 40. ROUND-LEAVED TOAD-FLAX.
- Leaves broadly hastate and acute. Plant hairy, trailing upon the ground. 41. ARROW-LEAVED TOAD-FLAX.

B. Flowering stems *erect*. Calyx-segments linear, and *longer than the corolla*. Flowers purplish, nearly sessile. Spikes lax and thin. Plant 9—12 inches high. 35. SMALL SNAP-DRAGON.

C. Flowering-stems *erect*, or rarely somewhat diffuse. *Corolla longer than the calyx*.

a. Plant *annual*, 4—10 inches high, branched, glandular and pubescent. Leaves lanceolate. Peduncles long. Flowers small, solitary, and axillary, the upper lip purplish, the lower one yellowish. 38. SMALL UPRIGHT TOAD-FLAX.

(STAMENS FOUR and DIDYNAMOUS. *Leaves alternate and scattered.* Flowering-stem *erect. Corolla longer than the calyx.*)

b. Plant *annual.* Stem glabrous. Leaves linear and mostly whorled. Flowers racemose.

Sepals twice as long as the capsule. Flowers purple, with darker veins. Stems 6—12 inches high. 37. JERSEY TOAD-FLAX.

Sepals shorter than the capsule. Flowers yellow, partly streaked with purple. 39. SEA TOAD-FLAX.

c. Perennials. Flowers (including the tail, if one be present) *an inch or more in length.* Leaves narrow, entire, and very numerous. Plant bushy, 1—2 feet high. Flowers in dense terminal spikes.

Corolla with a long tail that points perpendicularly downwards, rich yellow, or rarely milk-white, with an orange-coloured palate. Capsule ovoid. Spike imbricated. 36. COMMON YELLOW TOAD-FLAX.

Corolla without a tail, and merely swollen at the base, rose-coloured, red or whitish, yellow between the lips. Segments of the calyx ovate and obtuse. Capsule opening by three large and ragged pores. 34. COMMON SNAP-DRAGON.

d. Perennials. Flowers considerably *less than an inch in length.*

Sepals shorter than the long incurved spur. Plant 1—4 feet high. Leaves numerous, linear-lanceolate. Flowers in slender racemes, purple, or yellow with a purple throat. 44. TALL PURPLE TOAD-FLAX.

Sepals as long as the spur. Stem erect, branched, leafy, 12—18 inches high. Flowers white with blue veins. 43. CREEPING TOAD-FLAX.

7. Leaves *alternate and scattered*, or at least at the upper part of the plant, the lower ones sometimes opposite. Corolla open, *tubular or labiate*, the lips standing far apart.

* Stems 6—12 inches long, very slender, and, along with their branches, *trailing on the ground.* Leaves nearly circular, petiolate and crenate. Flowers solitary and axillary, very minute, whitish, the three upper segments of the corolla often tinged with red. Whole plant covered with minute hairs. 46. SIBTHORPIA.

** Plant *quite erect.* Leaves serrate or crenate.

a. Stem 2-3—5-6 feet high, nearly simple, roundish and downy. Leaves ovate, lanceolate, crenate, crumpled, veiny and downy, the blade tapering into a winged petiole. Flowers in tall unilateral spikes. Corolla tubular, large enough to admit the end of the finger, crimson or white, speckled and hairy in the inside, pendulous after expansion. Capsule many-seeded, and invested by the permanent calyx. Plant very stately. 33. FOXGLOVE.

(STAMENS FOUR and DIDYNAMOUS. Leaves *alternate and scattered.* Corolla labiate. Plant *erect.*)

b. Plant never exceeding 15 inches, and usually not more than 1—4 inches in height, usually much branched, and resembling a little shrub. Leaves ovate, serrate, and furrowed. Flowers axillary and solitary, abundant, and conspicuous from their snowy whiteness, the petals variegated with yellow and purple. *Upper lip of the corolla 2-lobed and spreading.* 21. EYE-BRIGHT.

c. Plant 3—12 inches high. *Upper lip of the corolla nearly entire, arched or concave.*

Flowers dull red or sometimes white, in unilateral racemes at the extremities of the numerous branches, which usually droop at the ends. Leaves lanceolate. Whole plant downy or hairy. 18. RED BARTSIA.

Flowers yellow, on short, axillary peduncles, chiefly at the upper part of the stem, which is erect, rigid, and usually simple. Calyx hairy and viscid. Leaves sessile. Whole plant covered with clammy down. 19. YELLOW BARTSIA.

SECTION III.

STAMENS FIVE. Stem erect, 2—6 feet high, terminating in a spike, sometimes more or less compound, of numerous yellow or whitish and showy pentamerous flowers. The corolla large, five-lobed, flattish and nearly regular, and the filaments of the five stamens (or three of them) conspicuously woolly with coloured hairs. Leaves simple and undivided.

1. *Leaves conspicuously decurrent*, oblong-lanceolate and pointed, the lower ones usually petiolate, and all 6—8 inches long. Plant covered in every part with a fleece of soft woolly hairs, the leaves resembling flannel. Spike of flowers 1—2 feet long, often with many minarets springing from the base. Flowers large, golden-yellow, primrose-like, almost sessile, and only a few expanding at once. Three of the filaments clothed with yellow hairs. Stigma green. 48. GREAT TORCH MULLEIN.

2. *Leaves not decurrent.* Spikes branched. Anthers all kidney-shaped.

a. Hairs upon the filaments *white.*

Leaves dark green and nearly glabrous upon the upper surface; white with soft woolliness upon the under one. Flowers numerous, small, on short pedicels, cream-coloured or whitish. Stem three feet high. 53. WHITE MULLEIN.

Leaves clothed upon both surfaces with mealy wool, which soon rubs off. Stem 3—5 high, copiously panicled at the upper part, the branches forming a handsome pyramid of innumerable large bright-yellow flowers. Leaves 9—15 inches long. 52. HOARY MULLEIN.

b. Hairs upon the filaments *purple* or *violet.* Stem simple, terminating in a long, erect and cylindrical spike, which is sometimes slightly branched. Leaves cordate, waved and crenate, veiny, nearly glabrous on the upper side, rather downy below, the petioles often 9—12 inches long. Flowers bright yellow, rather small. Pedicels twice as long as the calyx.—Stamens of equal length. 51. SAGE-LEAVED MULLEIN.

(STAMENS FIVE.)

3. *Leaves not decurrent*, or only very slightly so. Two of the stamens longer than the others, and with *long anthers*. Hairs on the filaments purple. Plant glabrous, or slightly glandular-hairy. Spike usually simple.

Pedicels 1—5 together, and shorter than the bracteas. Stem 3—4 feet high. Leaves oblong-lanceolate, doubly serrate, glandular-hairy.
49. BRANCHED MULLEIN.

Pedicels solitary, nearly twice as long as the bracteas. Stem 5—6 feet high. Leaves ovate-oblong, sinuate or crenate, and glabrous.
50. MOTH MULLEIN.

HABITATS AND DISTRIBUTION.

1. GREAT ROCK SPEEDWELL—*Veron'ica spica'ta.*

Upon limestone rocks, and in dry chalky pastures; rare. St. Vincent's Rocks. Ormeshead. Fl. July—September.

E. B. i. 2.

A very beautiful ornament of spots where it grows abundantly. Looking down from some of the upper ridges of St. Vincent's Rocks, it is seen as a blue curtain. A variety, with larger and broader leaves, and a tendency to form compound spikes, was formerly distinguished as *Veron'ica hyb'rida.* (E. B. x. 673.) The latter grows abundantly on Humphrey Head, near the southern extremity, and occurs also on St. Vincent's Rocks. In gardens not uncommon.

2. THYME-LEAVED SPEEDWELL—*Veron'ica serpyllifo'lia.*

Ploughed fields; meadows, where rather moist, and waysides. Common everywhere. Fl. May—August.

Curtis, i. 3; E. B. xv. 1075.

3. ALPINE SPEEDWELL—*Veron'ica alpi'na.*

Borders of little rills and among wet rocks upon the mountains of the Scotch Highlands; rare. Fl. July, August.

Curtis, iv. 581; E. B. vii. 484.

Bot. Mag. lvii. 2975 represent a singular variety called *Wormskiol'dii*, brought from moist alpine prairies on the Rocky Mountains, and found also in northern Europe.

4. PROCUMBENT ROCK SPEEDWELL—*Veron'ica saxat'ilis.*

Rocky places upon the Clova and Breadalbane mountains, Scotland, but rare. Abundant on Ben Lawers. Fl. July.

E. B. xv. 1027.

To this species is referable the *Veron'ica fruticulo'sa* of E. B. xv. 1028, a plant with elongated spikes of pinkish flowers, said to have been gathered in one or two places in the Highlands. The true *V. saxat'ilis* is a splendid plant for a collection of alpines.

5. NARROW-LEAVED BOG SPEEDWELL—*Veron'ica scutella'ta.*

Sides of ponds and marshy places, chiefly where the soil is sandy; rather rare. In Cheshire not infrequent. Fl. June, July.

Curtis, ii. 295; E. B. xi. 782.

A variety occurs, but rarely, with the stems somewhat downy.

6. Great Water Speedwell—*Veron'ica Anagal'lis.*

Pondsides, ditches, and in muddy and watery places; not uncommon. Fl. June, July.

Curtis, ii. 294; E. B. xi. 781 (coloured too blue.)

7. Brooklime—*Veron'ica Becabung'a.*

Clear ditches, and in shallow moving water, such as the watercress inhabit; common everywhere. Fl. June, July.

Curtis, i. 75; E. B. x. 655.

8. Medicinal-tea Speedwell—*Veron'ica officina'lis.*

Dry sandy ground, especially upon sunward hedgebanks: along the margins of dry, little-frequented lanes, and among the grass in dry parks. Common all over Britain. Fl. May—August.

Curtis, i. 146; E. B. xi. 765.

The *Veron'ica hirsu'ta* of E. B. Supp. i. 2673 is a little variety found growing upon moors in Ayrshire.

9. Germander Speedwell—*Veron'ica Chamæ'drys.*

Everywhere on hedgebanks, flowering in company with the hawthorn in May and June, and where shaded, or in a cold aspect, lasting till July.

Curtis, i. 2; E. B. ix. 623; Baxter, i. 50 (unfortunately coloured slate instead of azure.)

The flowers are the largest and most brilliant of any common English speedwell, and well known to everyone, giving myriads of blue eyes to the hedgebanks in early summer. Many plants of less beauty are tended in gardens with the utmost solicitude. From their lovely hue, they are often confounded with the forget-me-not. The corollas, as in all other speedwells, very soon fall off, and in wet weather and towards evening are apt to close and show their white undersurfaces. The leaves at the extremities of the shoots are often found converted into a hairy white knob, the work of an insect, whose family may be found inside. A variety is occasionally found with the leaves shortly petiolate.

10. Pale Sylvan Speedwell—*Veron'ica monta'na.*

Damp woods and cloughs; common. Fl. May, June.

Curtis, ii. 219; E. B. xi. 766.

Remarkable, like the *scutella'ta*, for the large, flat, circular, shield-like capsules. At first sight this plant might be mistaken for a small and poor state of the germander-speedwell, but in that the leaves are sessile, whereas in the pale sylvan-speedwell they are stalked. Besides, the germander-speedwell has two opposite rows of hairs upon the stem, which change at every joint to the contrary side, whereas in the *monat'na* the stem is hairy all round. The lax, straggling racemes of ripening capsules are very conspicuous, and quite unlike those of the *Chamæ'drys.* The name of *monta'na* is very ill-applied since the usual habit of the plant is under trees where there is plenty of moisture.

11. Ivy-leaved Speedwell—*Veron'ica hederæfo'lia.*

Ploughed land, everywhere, an idle and unremitting weed. Fl. March, April. Annual.

Curtis, i. 73; E. B. xi. 784.

The stem, like that of the chickweed, consists of a cylinder, enclosing an elastic thread.

12. Green Field Speedwell—*Veron'ica agres'tis.*

Cultivated ground, both farm and garden; common. Fl. May, June. Annual.

Curtis, i. 1 (not good); E. B. Supp. i. 2603.

13. Gray Field Speedwell—*Veron'ica poli'ta.*

Waste and cultivated ground, often in company with the *agres'tis;* common. Fl. May, June. Annual.

E. B. xi. 783 (as *Veron'ica agres'tis.*)

14. Buxbaum's Speedwell—*Veron'ica Buxbaum'ii.*

As a weed, in gardens and other cultivated ground; rather rare, and probably introduced. Fl. May—October. Annual.

E. B. Supp. ii. 2769.

Immediately distinguished from the two preceding by the large size of its flowers, which resemble those of the *Chamæ'drys*—by the peduncles being twice as long as the leaves, and the greater hairiness of the entire plant.

15. Spiked Field Speedwell—*Veron'ica arven'sis.*

Dry fields, especially among clover; upon old walls, where there is loose earth; and very frequent as a weed in kitchen-gardens, upon asparagus beds, and in other dry places Fl. May, June. Annual.

Curtis, i. 74; E. B. xi. 734.

16. Cut-leaved Speedwell—*Veron'ica triphyl'los.*

Dry sandy fields in Norfolk and Suffolk; rare. Fl. April, May. Annual.

Curtis, ii. 366; E. B. i. 26.

17. Little Vernal Speedwell—*Veron'ica ver'na.*

Dry fields about Bury and Thetford, Suffolk. Fl. April. Annual.

E. B. i. 25.

18. Red Bartsia—*Barts'ia Odonti'tes.*

Cornfields, and especially upon their borders, among the weeds. Also by waysides, where grassy and somewhat damp. Common. Fl. July—September. Annual.

Curtis, i. 44 (as *Euphra'sia Odonti'tes*); E. B. xx. 1415; Baxter, iii. 223.

Occasionally found with white flowers, and then losing much of the peculiar reddish hue which ordinarily distinguishes the plant from the greener surrounding ones.

19. Yellow Bartsia—*Barts'ia visco'sa.*

Dry fields, especially where sandy, and near the sea; rare. Cornwall. Devonshire. Borders of the Clyde. Southport, Lancashire, plentiful. Fl. August, September. Annual.

Curtis, iv. 625; E. B. xv. 1045.

20. Purple Alpine Bartsia—*Barts'ia alpi'na.*

Dry, rocky places in the mountainous districts, and in alpine pastures; rare. Very abundant near Middleton in Teesdale, growing both on the Durham and on the Yorkshire side of the river. Ben Lawers, upon a cliff overlooking Glen Lyon, very luxuriant. Fl. June, July.

Curtis, iii. 503; E. B. vi. 361.

21. Eye-bright—*Euphra'sia officina'lis.*

Dry, upland pastures where the herbage is short and scanty; along the grassy margins of country lanes; upon heaths, and on the slopes of green hills; frequent. Fl. July—September. Annual.

Curtis, ii. 334; E. B. xx. 1416; Baxter, i. 72.

A charming little plant, sometimes not more than an inch in height, with a solitary but full-sized blossom; sometimes so tall and bushy that the topmost flowers are a foot above the ground. The whiteness of the corollas is relieved by dark purple streaks, and the lower lip has a yellow spot.

22. Common Yellow-rattle—*Rhinan'thus Crista-gal'li.*

Among the mowing-grass; everywhere. Fl. June. Annual.

Curtis, ii. 335; E. B. x. 657; Baxter, iv. 259.

A lively and pretty ornament of the young hay-fields, but believed to encumber the crop rather than to enrich it. Along with the Red Bartsia, and the Eyebright, it is thought by some to be parasitic on the roots of the plants among which it grows. The undersides of the leaves are gray, and ornamented with curious network. *Rhinan'thus angustifo'lia* (the *Rhinan'thus ma'jor* of E. B. Supp. ii. 2737.) is a large variety, with narrow leaves, the flowers in crowded and bushy spikes, and the bracteas yellowish instead of green. Found principally in the north of England and in Scotland.

23. Common Sylvan Cows'-wheat—*Melampy'rum praten'se.*

Woods and thickets; frequent. Fl. July, August. Annual.

E. B. ii. 113 (not good.)

A small state of this pretty plant, more succulent in substance, and with the upper bracteas quite entire, is by some called *Melampy'rum monta'num.*

24. Alpine Cows'-wheat—*Melampy'rum sylvat'icum.*

Alpine woods in the north of England; rare. In Scotland less uncommon, though very local. Fl. July, August. Annual.

Curtis, iv. 626; E. B. xii. 804.

25. Crested Cows'-wheat—*Melampy'rum crista'tum.*

Woods, thickets, and bushy places; chiefly in the eastern counties, Norfolk, Cambridgeshire, Bedfordshire, &c. Occasionally in cornfields. Fl. July. Annual.

E. B. i. 41.

26. Purple Cows'-wheat—*Melampy'rum arven'se.*

Dry, gravelly banks and cornfields on light soil. Abundant in Norfolk, and especially about Norwich; and very plentiful in the south of Hampshire and the Isle of Wight. Fl. July. Annual.

Curtis, iii. 504; E. B. i. 53; Baxter, vi. 457.

27. Tall Marsh Red-rattle—*Pedicula'ris palus'tris.*

Wet and swampy places; general but not common. Fl. July, Aug.

E. B. vi. 399.

28. Common Red-rattle—*Pedicula'ris sylvat'ica.*

Swampy, uncultivated ground, and in moist and heathy pastures; very common everywhere. Fl. May—August.

E. B. vi. 400; Baxter, iv. 266.

The Latin specific names of this plant and of the *Melampy'rum praten'se* would seem to have been accidentally transposed, for the *Melampy'rum* is a woodland instead of a meadow plant; while the *Pedicula'ris*, so far from being sylvan, is always found in open, unshaded places.

29. Common Figwort—*Scrofula'ria nodo'sa.*

Moist ditchbanks; common everywhere. Fl. July, August.

E. B. xxii. 1544; Baxter, v. 385.

30. Great Figwort—*Scrofula'ria aquat'ica.*

In choice of habitat, similar to the *nodo'sa*, but not quite so common. Fl. July, August.

Curtis, ii. 336; E. B. xii. 854.

From this is distinguished by some botanists, *Scrofula'ria Ehrhar'ti.* (E. B. Supp. ii. 2875.) The leaves of the latter are narrower, and more sharply serrated; the flowers are fewer in number, seldom exceeding 4—8 in a panicle, and the capsule is sub-globular instead of ovoid.

31. Downy Figwort—*Scrofula'ria Scorodo'nia.*

Moist and watery places in the extreme south and south-west of England; at Tralee in Ireland; and in the Channel Islands. Fl. July, August.

E. B. xxxi. 2209.

32. Yellow Figwort—*Scrofula'ria vernal'is.*

Roadsides and waste places; rare. Norfolk. North Wales. Near Plymouth. Fl. April, May.

Curtis, iii. 505; E. B. viii. 567 (the latter incorrect as to the stamens, all of which arise from the base of the corolla.)

33. Foxglove—*Digita'lis purpu'rea.*

Rough and sandy hedgebanks, woods, slopes of hills, railway embankments, old stone-quarries, dry and grassy ledges of rocks, &c.; common, but more particularly in the northern parts of England, and in hilly and subalpine districts, where it is often sown broad-cast. Very abundant near Manchester. Superb in Arran and at Llangollen. Scarce near Bristol. In the eastern counties, as Norfolk and Suffolk, almost unknown. Fl. May—August. Biennial.

Curtis, i. 48; E. B. xix. 1297; Baxter, ii. 113.

The foxglove is the most stately of English wild-flowers, and imparts splendour to every scene of its production. In woods it is frequently seven feet high, and bears 60—70 flowers, the topmost not expanding till the capsules formed by the earliest are nearly ripe, and the last three or four hanging from the summit of their dismantled tower, like a flag nailed to the mast in unyielding valour. It forms one of that very distinct and interesting class of plants which, being *biennial*, are never found mixing with the short-lived plebeians of the ploughed field, but confine themselves to habitats where they will not be disturbed. With many of these, such as the Great Torch-mullein, the Vipers' Bugloss, Henbane, Weld, and the Musk-thistle, it is not uncommonly found associated. The structure of the flower will repay a very close examination. The corollas bulge out upon the under side, and on the inner surface are at this part hairy, and elegantly sprinkled with little carmine-coloured spots. These freckled caverns are often large enough to admit the end of the finger, and being contracted at the extremity next the calyx, like a waist, have obtained the name, with the Cheshire children, of "Fairies' petticoats." A white variety occurs in gardens, where also the common crimson-flowered plant is very general.

34. Common Snap-dragon—*Antirrhi'num ma'jus.*

Tops of old and earthy walls, especially of gardens; ruins of castles and monasteries, and upon rocks; not uncommon. Berkeley Castle and church, Gloucestershire, in profusion. Not wild in Scotland, and perhaps only naturalised in England and Ireland. Fl. May—November.

E. B. ii. 129; Baxter, iii. 169.

Extremely common in gardens, where the flowers vary to rose-colour, white, and yellowish, the latter sometimes pencilled with lilac or purple.

35. Small Snap-dragon—*Antirrhi'num Oron'tium.*

Dry waste places and cornfields; chiefly in the east and south o England. Wild also in Ireland, but not indigenous to Scotland. F July, August. Annual.

Curtis, ii. 265; E. B. xvii. 1155.

36. Common Yellow Toad-flax—*Lina'ria vulga'ris.*

Dry hedgebanks, frequently surrounded by briers; sometimes the borders of dry fields. Common. Fl. July, August.

Curtis, i. 47: E. B. x. 658 (both as *Antirrhi'num Lina'ria.*)

A formal and stiff but showy plant, easily recognised by its upright stems, thickly clothed with narrow-lanceolate glaucous leaves, and long spikes of bright-yellow flowers of the form called "personate" or mouth-like, the upper lip deeply stained with orange. The corolla sometimes assumes a regular pentamerous figure, having five spurs which spread from the base like the rays of a star, and individuals are by no means uncommon in which there are two or three such spurs. The complete form is figured both in Curtis and E. B. (ii. 495, iv. 260.) under the name of *Antirrhi'num Pelo'ria.*

The "*Lina'ria Ital'ica*" of Treviranus is probably a hybrid between the present species and the *re'pens*, mixed with which two plants it grows in the extreme south.

37. Jersey Toad-flax—*Lina'ria Pelesseria'na.*

"On a hill-side, growing amongst furze, between St. Peter's Barracks and a water-mill near St. Ouen's pond, Jersey." Fl. June. Annual.

E. B. Supp. ii. 2832.

38. Small Upright Toad-flax—*Lina'ria mi'nor.*

Dry, sandy fields, chiefly in the south and south-east of England. In Scotland and Ireland very rare. Fl. June, July. Annual.

Curtis, ii. 333; E. B. xxviii. 2014 (both as *Antirrhi'num mi'nus.*)

39. Sea Toad-flax—*Lina'ria supi'na.*

Coasts of Devonshire, Dorsetshire, and south Cornwall; possibly a native, but more probably introduced with ballast. Fl. July, August. Annual.

40. Round-leaved Toad-flax—*Lina'ria spu'ria.*

Dry and sandy cornfields; almost confined to the southern parts of England. Horfield, near Bristol. Plentiful in some parts of Norfolk and Suffolk. Fl. July—September. Annual.

Curtis, i. 182; E. B. x. 691 (both as *Antirrhi'num spu'rium.*)

41. Arrow-leaved Toad-flax—*Lina'ria Elat'ine.*

Cornfields, especially upon gravel and limestone. Occasionally as a weed in gardens, among onions, &c. Fl. June, July. Annual.

Curtis, i. 46; E. B. x. 692 (both as *Antirrhi'num Elat'ine.*)

42. Ivy-leaved Toad-flax—*Lina'ria Cymbala'ria.*

Walls, both new and old, especially those surrounding the gardens and court-yards of country mansions; also upon bridges, below the parapets, and on rockeries. Very common, but in no case truly wild. Fl. May—October.

Curtis, i. 45; E. B. vii. 502 (both as *Antirrhi'num Cymbala'ria*); Baxter, i. 23.

This well-known little trailer is a native of Italy, and was introduced undesignedly by means of seeds mixed with hay that protected some marble sculptures sent to Oxford. It is one of the neatest ornaments that can be selected for a wall or rockery, and flourishes if kept in a pot of earth in a greenhouse, and allowed to swing its long branches from a bracket or suspended basket.

43. CREEPING TOAD-FLAX—*Lina'ria re'pens.*

Dry banks and rocky places; chiefly upon limestone and near the sea, and found in few parts except the south of England and Ireland. Cornwall. Near Cork. Fl. July—September.

E. B. xviii. 1253 (as *Antirrhi'num re'pens.)*

44. TALL PURPLE TOAD-FLAX—*Lina'ria purpu'rea.*

A Neapolitan plant, common in gardens, from which it has migrated into waste places, and is now becoming naturalised, as at Horfield and Brislington, near Bristol. Fl. August—October.

Bot. Mag. iii. 99.

45. LIMOSELLA—*Limosel'la aquat'ica.*

Muddy places, where water has stagnated during the winter, and on the sandy borders of pools and meres; frequently in company with the *Littorel'la lacus'tris.* Not rare. Fl. summer. Annual.

Curtis, iii. 506; E. B. v. 357; Baxter, iii. 212.

46. SIBTHORPIA—*Sibthor'pia Europæ'a.*

Moist and shady places, in the neighbourhood of springs and rivulets Common all over Cornwall: occurs also in Devonshire, and near Tralee, Ireland. Elsewhere in Britain not known. Fl. summer.

E. B. x. 649; Baxter, iii. 215.

This delicate little plant does nicely in an indoor fernery, if allowed to ramble among mosses and selaginellas.

47. YELLOW MIMULUS—*Mim'ulus lu'teus.*

A common garden-plant of North American origin, now naturalised on the banks of rivers and streams in many parts of England. Dunham, near Manchester, very luxuriant. Fl. July, August.

Bot. Mag. xxxvi. 1501.

48. GREAT TORCH MULLEIN—*Verbas'cum Thap'sus.*

Dry banks and waste ground; and upon earthy cliffs and the tops of old walls, where the soil is calcareous or gravelly. Common as far north as Aberdeen. Fl. July, August. Biennial.

E. B. viii. 549 (but incorrect as to the hairs of the stamens.)

An exceedingly noble plant, consisting, when full grown, of a slender cylindrical pillar, 6—7 feet high, a yard or more of the upper portion crowded with flower-buds, embedded in nests of vegetable flannel, and that open, like those of the chicory, only three or four at a time. The corollas soon fall to the ground, and are occasionally so pale a yellow as to be almost white.

49. BRANCHED MULLEIN—*Verbas'cum virga'tum.*

Dry fields and waysides; rare both in England and Ireland, and in Scotland not met with. Fl. July. Biennial.

E. B. viii. 550.

50. MOTH MULLEIN—*Verbas'cum Blatta'ria.*

Dry banks upon gravelly soil; very rare, and apparently confined to the extreme south and south-west. Fl. July, August. Biennial.

E. B. vi. 393.

51. SAGE-LEAVED MULLEIN—*Verbas'cum ni'grum.*

Dry and warm hedgebanks and waysides, where the soil is gravelly or chalky; rather rare, and really wild only in the southern and midland counties. Fl. July, August.

Curtis, iii. 460; E. B. i. 59; Baxter, ii. 85.

52. HOARY MULLEIN—*Verbas'cum flocco'sum.*

Banks, fallow fields, and roadsides, where dry and gravelly or chalky; rare, except in Norfolk and Suffolk, and apparently not existing further north. Fl. July. Biennial.

E. B. vii. 487 (as *Verbas'cum pulverulen'tum.*)

53. WHITE MULLEIN—*Verbas'cum Lychni'tis.*

Dry fields and waysides, chiefly where the soil is chalky; widely disseminated, but rare, and apparently confined to England and Wales. Abundant between Gresford and Wrexham. Fl. July, Aug. Biennial.

E. B. i. 58.

The showy flowers of this family secure for it a permanent place in every garden, though they seldom appear in bouquets. Clamminess of the stems, unaccommodating stiffness or laxity of the stalks, loose attachment of the corollas, or a heavy and displeasing odour, give to the greater portion an almost perfect immunity from the knife. *Veron'icas* in many species, lead the way among the hardy ones, especially the ancient white-flowered *Veron'ica gentianoi'des*, the flowers of which grow in broad racemes 12—18 inches in height. Indoors they are accompanied and even preceded by the charming *Calceola'rias*, with large broad cymose panicles of pocket-shaped blossoms that present every colour except orange and blue, from cream up to maroon, and are often speckled in the most quaint and beautiful manner. This genus is one of those with only two stamens. After the Calceolarias there are few novelties till the summer annuals begin to bloom. These comprise species of *Lina'ria, Collins'ia,* (Bot. Mag. lxvi. 3695.) *Schizan'thus,* (lviii. 3044, 3045, 3070.) *Neme'sia,* &c., mostly with parti-coloured and often fantastical corollas. In *Lina'ria triornithoph'ora* the flowers resemble three little birds perched so as to form a triangle, with their long yellow tails turned to the outside: *Lina'ria triphyl'la* (ix. 324.) is one of the oldest favourites in our gardens; *Lina'ria biparti'ta* is one of the most deserving. The genus Schizanthus is known by its remarkably 5-cleft and incised corollas, growing in diffuse panicles, parti-coloured, and with only two stamens. Of the perennials, which, as a rule, make their appearance rather late, but last all through the autumn, the most effective are comprised in the genera *Mim'ulus, Chelo'ne,* and *Pentste'mon.* The first, which begins in May, includes the gaudy plants called "monkey-flowers," the five broad lobes of their corollas often marked with a large dark spot. The stigma in this genus is formed of two thin lips that stand apart while unmolested, resembling an open mouth; if slightly tickled upon the inner surface, they draw together rapidly, and shut up like a shell-fish. The common musk-plant is *Mim'ulus moscha'tus*, a native of California, and distinguished not more by its heavy musky odour, than by the smallness of its yellow flowers. *Mim'ulus ro'seus* has very pretty light red flowers. In *M. rin'gens* and *ala'tus* they are blue. *M. cardina'lis* (lxiv. 3560.) is a splendid scarlet-flowering species. *Mim'ulus* or *Dip'lacus glutino'sus* (x. 354.) is clammy, and has orange-coloured flowers. *D. puni'ceus* (lxv. 3655.) is clammy and scarlet. In the *Chelo'nes* the upper portion of the corolla is shaped like the back of a tortoise. *Chelo'ne barba'ta*, the commonest, is scarlet; *Chelo'ne gla'bra*, white; *Chelo'ne obli'qua*, purple. *Pentste'mons* are distinguished by their fifth but antherless filament, and like many other genera in this versatile family, present a considerable diversity of colours. Blue, purple, scarlet, rose, and white are the prevailing tints. *Pentste'mon cordifo'lius*, (lxxvi. 4497.) unlike all the remainder, is a trailer. The common upright Pentstemon, with long and narrow scarlet flowers, is *P. gentianoi'des*, from Mexico. Besides these, there are many fine exotic species of *Digita'lis*, *Verbas'cum*, and its near ally *Cel'sia*, but none very common, except the yellow *Cel'sia Arctu'rus*. The yellow *Digita'lis lu'tea* (lxviii. 3925.) attains the height of 4—5 feet; *Digita'lis lana'ta* (xxix. 1159.) has dense clusters of white and pink flowers; in the *Digita'lis tomento'sa* they are blush-coloured, and spread in all directions. *Hemim'eris* or *Alonso'a* (xii. 417.) is a singular genus with flat and oblong vermilion flowers, black in the centre. *Grati'ola officina'lis* or Hedge-hyssop, almost the only plant in the family of economic service, has lanceolate and serrate leaves, and light blue and inconspicuous flowers with two stamens.

The greenhouse and hothouse species are plants mostly of high merit. *Mauran'dya semperflo'rens* is a beautiful twiner, with hastate leaves, and long-continuing flow of purple bloom. *Colum'nea scan'dens* is also a twiner, producing scarlet blossoms. *Lophosper'mum atrosanguin'eum* or *Rhodochi'ton volu'bile* (Bot. Mag. lxi. 3367.) climbs to the height of several yards, chiefly by means of its twisted petioles, and in sheltered situations does well even in the open air. The flowers of this magnificent plant are campanulate, 3 inches long by 2 in breadth, axillary, solitary, and rose-coloured with interior freckles: the leaves are triangular-cordate, opposite, petiolate, coarsely-toothed, and 5—6 inches long and broad. It was introduced from Mexico in 1833. For a suspended basket there is nothing more beautiful than *Tore'nia Asiat'ica* (lxxii. 4249.) The branches, which are quadrangular and glabrous, and well-clothed with ovate leaves, hang over the sides to the depth of 2 or 3 feet, and put forth exquisite blueish-violet flowers, the lips of which have darker blotches of the same colour. *Tee'dias*, *Halle'rias*, (xlii. 1744.) *Anthocer'cis visco'sa*, (lvii. 2961.) a handsome evergreen with large white blossoms, streaked internally with green; *Trevira'na coccin'ea*, by some called *Cyril'la pulchel'la*, (xi. 374.) *Browal'lias*, (xxviii. 1136.) *Manu'leas*, *Chænos'tomas*, and tree-speedwells from the antipodes, show, like the others, how much floral treasure is here collected. *Veron'ica decussa'ta*, from the Falkland Islands, (vii. 242.) is half-hardy, growing 3 feet high in the open borders, with evergreen foliage, and long erect spikes of white or blueish flowers. *Angelo'nia salicariæfo'lia* is a hothouse plant with spikes of purple flowers that yield the odour of "sweated apples."

Tall shrubs and even arborescent forms are not unknown to the family, as instanced in that striking Chilian plant, the *Bud'dlea globo'sa* (v. 174.) The leaves of this are 4—9 inches long, lanceolate, crenate and acuminate, and clothed on the under surface with hoary down. The flowers are produced in orange-yellow globular heads an inch in diameter, and evolve an agreeable and honey-like odour. In genial situations the Buddlea will often attain the height of 12—15 feet; in wet and exposed ones, it is preserved with difficulty. Some other species of the genus are in cultivation, as *Bud'dlea conna'ta* (lv. 2853.) and *Bud'dlea Brazilien'sis* (liv. 2713.) The flowers of the former grow in clustered and reddish globes; those of the latter in orange-yellow and interrupted leafy spikes like those of certain Labiates. *Paulow'nia imperia'lis* (lxxviii. 4666.) is absolutely a tree, but too tender for the average of English winters. In the *Jardin des Plantes* at Paris it attains the height of 20 feet, and produces abundance of great panicles of purplish flowers. This splendid plant is a native of Japan, from which country it was brought hither in 1840. Of the smaller shrubby species, none are more attractive than the *Francis'ceas*, now frequent in good hothouses. All are Brazilian, and have brilliant violet-purple flowers an inch across, and changing to white after maturity, as in *Francis'cea uniflo'ra* and *Francis'cea latifo'lia* (lv. 2828, lxviii. 3907.) *Salpiglos'sis* is a handsome Chilian genus with flowers approaching those of the *Petu'nia*, and forming one of the links between this family and the *Solana'ceæ*, as in *Salpiglos'sis sinua'ta* (lv. 2811.) The petals in all the species are richly-coloured and beautifully veined and mottled, and have a soft velvety surface such as occurs in flowers but seldom. Purple and orange, cream-colour veined with blue, yellow and blueish-purple, are some of their fine combinations. The yellow-flowered *Brunsfel'sia America'na* and *nit'ida* (xi. 393, lxxiii. 4287.) with others of less moment, are frontier plants on the same side. *Tweed'ia cœru'lea* (lxv. 3630.) has cordate-lanceolate leaves, and clusters of 3—5 pale blue flowers not very unlike those of a periwinkle. *Disan'dra prostra'ta* (vii. 218.) is a very pretty little trailer from Madeira, with reniform and crenate leaves, and pairs of axillary yellow flowers, on long peduncles. The parts of the flower are usually in *sevens*, presenting a wide contrast to the usual character of the family. *Eri'nus* and *Nycterin'ia* are esteemed for their neatness and fragrance.

CV. THE BIGNONIA FAMILY.—*Bignonia'ceæ.*

A noble family of trees, shrubs, and herbaceous plants, having its principal seat in the tropics—in Europe quite unknown in the wild state—and standing as the centre of a fine alliance in which the corolla is "trumpet-shaped," that is to say, formed of four or five petals, which are united for at least half their length, the tubular portion much distended, and the lobes more or less irregular and spreading. Many of the species are climbers or twiners. The leaves are in almost all cases opposite, usually *quasi*-pinnate or doubly-ternate, and often tendrilled. The flowers are produced, for the most part, in large panicles; they are of various colours, red and yellow predominating, usually of great size, and eminently beautiful, if not magnificent. The stamens are usually five, but one at least of them is always destitute of its anther, and not uncommonly only two are perfect; the ovary is solitary and 2-celled; the seeds have a broad and membranous wing, and a large and leafy embryo. The bordered seeds form the grand characteristic of the whole of the species, especially when the family is compared with that named after the Foxglove. Those of one of the great American arborescent species, the *Bigno'nia echina'ta*, rank with the most beautiful objects of vegetable nature. They are contained in a hard brown pod, six or eight inches long by two in breadth, and rough over its whole surface with blunted asperities. The pod is divided into two compartments by a loose floor, on either side of which the seeds are disposed in layers, every one of them an inch and a half or two inches in length, and consisting of a small, thin, circular, and opaque nucleus, and a pair of filmy and transparent wings, which gleam with prismatic colours, and are united at the line of contact. The seeds of the rare and noble tree called the *Catal'pa*, which occasionally ripen in the south of England; and those of the *Calam'pelis*, (procurable at the shops) exhibit the family character equally well, though on a scale much reduced. The *Catal'pa* produces its handsome cordate leaves in whorls of three. It grows rapidly to the height of 20—40 feet, flowering, when well situated, every year, and making a splendid appearance, alike in the fine tint of its foliage,—which is of a different shade of green from that of every other tree, and is approached only by the Negundo,—and in its large and abundant panicles of gay blossoms. The corolla is white, speckled internally with purple and yellow; the seed-pods are 12—20 inches long, horny, clustered, pendulous, and about half an inch in width. They have many times attained perfection upon the celebrated old tree at Hampton Court. There is another famous Catalpa in Gray's Inn Gardens (of late years, however, much dilapidated) which, tradition says, was planted by Lord Bacon. *Calam'pelis* is one of the herbaceous genera, and well-known in the species sometimes called *Eccremocar'pus sca'ber*—an ornamental climber from Chili, with doubly-pinnatifid and tendrilled leaves, and panicles of curiously curved and inflated corollas, an inch or two in length, and of a deep orange red colour. This genus differs from the rest of the family in having an ovary of only one cell. *Tec'oma rad'icans* (Bot. Mag. xiv. 485.) from Brazil, is another splendid climber, sufficiently hardy to thrive out of doors in genial parts of the country. In its native forests it attaches itself to trees by means of holdfasts like those of ivy, and under cultivation clings similarly to walls. The leaves are formed of nine ovate, serrate, and glabrous leaflets; the great scarlet and orange flowers are produced in panicles. *Tec'oma grandiflo'ra* (xxxiv. 1398.) has similar, but even more splendid and deeper-coloured flowers; in *Tec'oma jasminoi'des* from Moreton Bay (lxix. 4004.) the flowers are white. Of Bignonias properly so called, there are many in cultivation. *Bigno'nia Tweedia'na* from Buenos Ayres, has rich golden-yellow blossoms; in *B. specio'sa*, also Brazilian, (lxviii. 3888.) they are of a fine rosy lilac, every corolla, when fully expanded, three inches long by two in width. *Jacaran'das* are lofty plants with leaves like those of multifid ferns or pinnate acacias. *Jacaran'da ovalifo'lia* from tropical South America (xlix. 2327.) has brilliant blue flowers; in the *J. tomento'sa* they are orange and white. *Adenocalym'na como'sum* (lxxii. 4210.) is another of the yellow-flowered Brazilian climbers. *Spatho'deas* from Sierra Leone, species of *Amphic'ome* from the Himalayahs, *Tourre'tias* from Peru, *Incarvil'leas*, and many others, have been introduced of late years, and are gradually making their way into choice hothouses and Botanic Gardens.

CVI. THE THUNBERGIA FAMILY.—*Acantha'ceæ.*

The Acanthaceæ, like many other families, are almost exclusively tropical. There are very few examples of their advancing northwards, and the only instance in which they are represented in Europe is that of the typical species, the celebrated Acanthus of Greece—the plant which gave to Callimachus the idea of the Corinthian capital. (Virgil's Acanthus, it must be remembered, was not the same, and probably the yellow-berried holly; while the Acanthus of Theophrastus seems to have been the tree now called *Aca'cia Arab'ica.*) Nearly all the species are herbaceous; in hot countries they often form a large portion of the weedy undergrowth, but under cultivation they are noted for their rare and delicious beauty. The leaves are opposite and simple, and usually undivided and entire—the condition of the classical Acanthus, in which plant they are deeply feather-lobed and waved, being quite exceptional; sometimes they are variegated, as in certain *Aphelan'dras*, which have them marked with white bars extending from the midrib to the margin. The corolla is formed of four or five united petals, and mostly irregular; the stamens are epipetalous, usually two, but sometimes four, and then either of equal length or didynamous; the ovary is solitary, free, and 2-celled. In the majority of cases these handsome plants may be recognised by the abundance of their large and leafy bracts, two or three of which accompany every flower, and which are often of some fine colour. In *Aphelan'dra Portea'na*, they are deep orange; in the *Eran'themum pulchel'lum*, white, veined with green, and closely appressed, combining with the rich blue-purple blossoms to form one of the choicest objects of the hothouse. The inflorescence is often densely spicate or capitate, greatly heightening the effect of the bracts, especially when the latter are coloured; the calyx is composed of four or five deeply imbricated sepals, which are sometimes exceedingly small. The great peculiarity of the family consists, however, in the singular structure of the placenta, which expands into hard woody processes, to which the wingless seeds are attached. The latter are exalbuminous, differentiating these plants from the albuminous *Scrofularia'ceæ*. The most familiar examples of the family are the climbing *Thunber'gias*, plants with flat and nearly regular corollas an inch or two across, buff-coloured or white, and with a dark orifice in the centre, that, at a little distance, seems a spot. *Justi'cias* have splendid heads of long and slender yellow or crimson flowers. *Ruel'lia formo'sa* (Bot. Mag. xxxiv. 1400.) bears its scarlet flowers on long axillary peduncles. In *Strobilan'thes Sabinia'na* (lxiii. 3577.) the buds resemble fir-cones, and become spikes of fine blue-purple flowers. *Salpixan'tha coccin'ea* (lxxi. 4158.) is under-shrubby, and produces a profusion of pendent scarlet blossoms. Some species, as *Dipteracan'thus Herb'stii*, occupy the position both of flowering and "ornamental foliage" plants. The flowers of this are white and rose-colour, and are borne on long and erect peduncles; the upper surface of every leaf has a silvery feather up the centre, while the under surface is of a rich crimson bronze. *Thyrsacan'thus ru'tilans* is the best of all plants for decorating an epergne at Christmas, producing crimson flowers in trails that reach to the length of more than two feet. The Peruvian *Adelas'ter albive'nis* is a beautiful little climber with white-veined leaves. *Acan'thus* itself is a handsome herbaceous perennial, producing tall green spikes, formed of broadly ovate bracts, with spines like those of holly, and in the axils of which are white corollas consisting only of a great 3-lobed lower lip, which scarcely projects beyond the surface of the spike. The flowers appear in autumn.

CVII. THE SELAGO FAMILY.—*Selagina'ceæ*.

These plants come very near to the *Verbena'ceæ*, the final distinction consisting only in the position of the ovules, which in the present family are pendulous. The species are natives principally of the Cape of Good Hope, whence we have received several pretty little greenhouse shrubs, especially of the typical genus Selago. The leaves of these are linear, scattered, entire, and glabrous; the purplish-red or light blue flowers form terminal and umbellate heads, and one of the five segments of the corolla is usually much longer than the others. Two of the stamens are hidden in the tube; the other pair, with the pistil, projects beyond it. *Hebenstreit'ias* have neat foliage and modest white flowers, which are said to be scentless when they open in the morning, powerfully odorous by noon, and in the evening simply sweet. *Globula'rias* are South European, and by some botanists considered representative of another family. *Globula'ria vulga'ris* (Bot. Mag. xlviii. 2256.) has obovate radical leaves, 1—3 inches long, and a simple and erect flower-stem 3—6 inches in height, well clothed with oblong and sessile leaves, and terminating in a dense globular head of blue flowers not very unlike that of the *Jasi'one.* The three upper segments of the 5-cleft corolla are very much longer than the lower ones; and the four deep-blue anthers project a considerable distance. In the month of May the Globularia is a lively ornament of the pastures of Switzerland, from which is has been transferred to English gardens.

CVIII. THE GLOXINIA FAMILY.—*Gesnera'ceæ.*

Nearly all the species of this family are tropical, their principal native stations being central America, the warm valleys of the Himalayahs, and the islands of the Indian Archipelago. Hence, like the Acanthaceæ, they are inmates, almost exclusively, of the hothouse. In habit they are mostly herbaceous; some are disposed to climb, and a few are more or less epiphytic. Some species have only radical leaves, which, as in the *Gloxin'ia hirsu'ta*, lie flat upon the ground. Not infrequently they are found to partake of the aspect of plants of the Foxglove family, and cursorily examined only when in flower, they sometimes appear technically indistinguishable from them. The corolla is tubular, pentamerous, and more or less irregular; the stamens are normally two or four, and in the latter case didynamous; the ovary is solitary and many-seeded. Important differences exist however in the structure of the fruit. In the Gesneraceæ the placenta is *parietal;* in the Scrofulariaceæ it is *axile.* After the difference in general figure and expression, which the eye soon catches, the readiest distinctive marks consist perhaps in the strong tendency of the Gesneraceæ to form epigynous flowers, and in the very frequent cohesion of the anthers, though this last character occurs sometimes in the Scrofulariaceæ, as mentioned on p. 397. In the genus *Gloxin'ia* the anthers hold to one another so firmly as to require the knife before they will separate. The filaments stand in two pairs of unequal length, and are curved into an elegant double lyre. (Fig. 151.) The genus just named is the ordinary representative of the family. *Gloxin'ia specio'sa*, the splendid species most commonly cultivated, has a large tuft of radical leaves, from among which rise numerous scapes bearing each a solitary and horizontal flower of the figure represented in the cut. The colours run through every shade of purple and pink, and the deepest and finest tints are usually found in the interior. Examples are not rare of an abnormal or "peloria" form, with the corolla as erect as a wine-glass, perfectly regular, and with five stamens of equal length, the anthers combined as usual. *Achime'nes* is another very popular genus. In its season, nothing is finer to behold than an *Achime'nes longiflo'ra* or an *Achime'nes pic'ta*, the former deep purplish-blue, the latter scarlet and orange. *Æschynan'thus* in its different species supplies flowers quite as beautiful, and in figure very uncommon. The *Æschynan'thus al'bida* is a remarkably handsome plant, having clusters of large crimson blossoms at the extremities of the pendulous branches, from which they bend upwards like the bowls of Turkish hookahs.—*Ges'neras*, the typical plants of the family, produce their flowers in magnificent panicles. The rich scarlet and yellow of their copious and drooping blossoms is equalled in beauty by their velvety and variegated foliage, which of itself renders them desirable ornaments of the hothouse. *Ges'nera zebri'na* (Bot. Mag. lxviii. 3940.) is a truly splendid plant. The stems rise 2—3 feet high; the mottled and velvety leaves are five

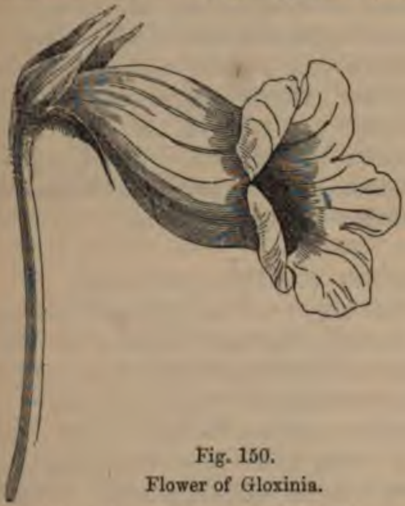

Fig. 150.
Flower of Gloxinia.

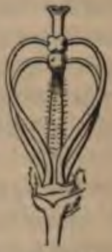

Fig. 151.
Stamens and Pistil of
Gloxinia.

or six inches in length and breadth, and in form nearly cordate; the peduncles are nearly erect, but the flowers half-pendulous; the corollas are yellow, and thickly sprinkled with scarlet dots. *Ges'nera bulbo'sa*, (lxviii. 3886.) so called on account of its tuberous roots, is another very splendid species, the scarlet flowers being 2—3 inches long. All of this showy race have the lower half of the ovary embedded in the tube of the calyx. *Besle'rias* are remarkable for the brilliant colour of their calyces, which are generally vivid scarlet, while the corolla is yellow, as in the *B.* or *Chrysoth'emis pulchel'la* of Trinidad (xxviii. 1146.) The handsomest of them is probably the *B. coccin'ea* of Guiana, which has the additional merit of continuing long in bloom. *Didymocar'pus* (or *Streptocar'pus*) *Rex'ii* (lvii. 3005.) is a curious little perennial from southern Africa, with ovate-oblong leaves 3—6 inches in length, and prostrate upon the soil, and solitary half-pendulous lilac flowers on bracteated scapes. The capsules are several inches long, erect, slender, and spirally twisted. *Sarmien'ta re'pens* is a little trailer from Chili, well adapted for baskets; the leaves are about an inch in length; the light scarlet and axillary flowers are much inflated in the middle, and bear a near resemblance to those of the *Mitra'ria*—another of the comparatively new and admired plants of this favoured family. *Campa'nia; Colum'nea scan'dens* and several others of the same genus; (lxix. 4045, lxxiii. 4330.) *Arctoca'lyx*, an extraordinary plant from Vera Cruz, shaggy all over, like a bear, partly epiphytal, and with yellow corollas two inches long; *Chiri'ta*, a splendid Cingalese genus, with one or two species from China; (lxxi. 4182, lxxiv. 4405, &c.) various species of *Cyrtan'dra*, *Agalmy'la*, *Nematan'thus*, (lxix. 4018.) *Sinning'ia*, and many more, enrich all good collections of tropical plants that require an atmosphere at once damp and very warm. Without such an atmosphere they never succeed; hence too the beautiful flowers that give such eminence to the Gesneraceæ, for the most part soon fade after being cut and exposed to the open air, even of a parlour.

CIX. THE SESAME FAMILY.—*Pedalia'ceæ.*

In their technical characters, the twenty-five or thirty species of this family resemble the *Bignonia'ceæ*, from which they differ in having wingless seeds and parietal placentæ. The latter character distinguishes them also from the Foxglove family. A certain degree of collateral likeness exists moreover with regard to the Gesneraceæ, but from these they are at once distinguished by the large size of the seeds, those of the latter family being very minute, and also by the hard and woody pericarp. All are herbaceous; they are mostly covered with glandular hairs; many have a heavy odour, and the flowers are often large and shewy. The corolla, as in the allied families, is tubular and irregular, and wide at the mouth; the stamens are either two or four, in the latter case didynamous, and the rudiment of a fifth is generally present.

Though few in number, the species are very interesting. *Martyn'ias*, the best known, are handsome tropical annuals, remarkable for the large size of the corolla in comparison with that of the leaves. *Martyn'ia lu'tea* has yellow flowers; *M. fra'grans* (Bot. Mag. lxxiii. 4292.) has purple and very fragrant blossoms. The stigmas of these plants are 2-lipped, the lips closing when touched, like those of the *Mim'ulus*. The capsule of the American *Martyn'ia proboscid'ea* (xxvi. 1056.) is ovoid, prickly, and with the carpels extended into curved horns 3—4 inches in length. That of the *Peda'lium Mu'rex* is nut-like, and provided with four little horns. *Ses'amum Orienta'le* and *Ses'amum In'dicum* yield the famous grain of the "Arabian Nights," valued to this day in south-western Asia for the sake of the oil which it yields on compression. The latter, occasionally seen in gardens, and figured in Bot. Mag. xli. 1688, is a neat little plant with opposite, ovate and pointed leaves, and axillary flowers of a light rose-colour.

CX. THE BUTTERWORT FAMILY.—*Lentibularia'ceæ.*

A family of about 170 very pretty little herbaceous plants, living either on wet moors, chiefly in mountainous regions, or in marshes and ponds, and dispersed all over the world. Leaves, in the land species, simple and radical; in the European aquatic kinds, wholly submerged and finely divided, so as to resemble roots, and thickly hung with minute air-bladders. Flowers upon scapes 3—9 inches high; in the land species solitary, in the aquatics, slightly racemose. Corolla very irregular, 2-lipped, and projecting at the base into a spur; stamens usually two; stigma 2-lipped; ovary solitary; capsule 1-celled, with many seeds attached to a central placenta, in which respect these plants resemble the Primulaceæ, while the irregular and spurred flowers, and several other points of structure, indicate affinity with the Foxglove family. On the Organ Mountains of Brazil, 5,000 feet above the level of the sea, there grows, according to Gardner, an extraordinary species of *Utricula'ria*, with peltate leaves, 3 inches across, and a flower-stem 2 feet long, supporting numerous large purple blossoms. It is found only in the water which collects in the teasel-like leaves of a great *Tilland'sia*, propagating itself chiefly by runners, the latter shooting out to the adjacent

Tillandsias, and often uniting half a dozen of them. In New Holland, and in different parts of the tropics, there are many other Utricularias, with simple and undivided leaves, and usually blue flowers.

Five species British.

A.

Plant submerged in water, with fibrous root-like branches, 3—12 inches long, and triply-pinnatifid leaves, the latter hung with little green bladders. Flowers 2—4—8 together, on the summit of a leafless stem which rises 3—6—10 inches above the surface.

Corolla rich yellow, about half an inch long, the spur conical, the lower lip broad and convex, and streaked with orange. Submerged branches 6—12 inches long. Leaves minutely fringed.
1. COMMON BLADDERWORT.

Similar to the preceding, but smaller and more tender in all its parts, the floating portion often intricately branched. Flowers pale-yellow, with the lower lip much flattened, and the spur usually reduced to a short and broad protuberance. Leaves not fringed.
2. SMALL BLADDERWORT.

B.

Plant not submerged in water, though often growing in marshy places. Leaves oval, 1—2 inches long, entire, radical, spreading, the margins rolled inwards, light yellowish green, somewhat succulent, and covered with little crystalline points, which give them a greasy and clammy appearance. Flower-stalks radical, leafless, 3—5 inches high, and bearing a solitary blossom upon the summit.

Flower blueish-purple, handsome, not unlike a purple violet, and half-pendulous; the palate covered with white hairs, and the spur long and slender, and nearly straight. 3. COMMON BUTTERWORT.

Flower yellowish or very pale purple; the spur small, and either conical or curved.

Spur very short, obtuse and nearly straight. Lower lip of the corolla with the central lobe longer than the two lateral ones. 4. ALPINE BUTTERWORT.

Spur curved. Lobes of the lower lip of the corolla nearly equal in size. 5. PORTUGUESE BUTTERWORT.

HABITATS AND DISTRIBUTION.

1. COMMON BLADDERWORT—*Utricula'ria vulga'ris.*

Ponds, ditches, and deep standing waters. Distributed all over the country, but nowhere common or plentiful. Fl. June, July, most freely in *deep* water.

E. B. iv. 253; Baxter, v. 349.

2. SMALL BLADDERWORT—*Utricula'ria mi'nor.*

Ditches and ponds on moors and peat-bogs. Similar to the last in distribution, but in England rather less general than in Ireland and Scotland. Fl. June, both in deep and in shallow water.

E. B. iv. 254.

The Utricularias make admirable aquarium plants, alike in the beauty of their light-green and vesicular branches, and in the elegance of their flowers. In the aquarium, moreover, it is easy to note the curious economy of their propagation. In autumn a very considerable amount of decay appears to take place, the large terminal buds of the branches dropping off at the same time, and remaining dormant at the bottom until spring, when they put forth their tiny leaves, and as soon as bladders are developed, become buoyant, and ascend to near the surface of the water. These hybernating buds appear to have been mistaken for "seeds," but true seeds would seem to be very rarely if ever ripened. The bladders have an aperture at the smaller end, and are charged with air while the plant is in bloom.

The plant called by some authors *Utricula'ria interme'dia,* (E. B. xxxv. 2489.) is probably identical with the *U. mi'nor.*

3. COMMON BUTTERWORT—*Pinguic'ula vulga'ris.*

Boggy places, and among wet rocks in the middle and north of England, Wales, Scotland, and Ireland; not rare. Abundant and very luxuriant between Buxton and Bakewell, Derbyshire. Island of Arran, plentiful. Fl. June, July.

Curtis, iii. 438; E. B. i. 70; Baxter, iii. 209.

The lovely blue flowers are as much like a little Gloxinia as a purple violet, and give great beauty to the desolate places in which they are met with. The name refers to the greasy appearance and fatty texture of the leaves. When the plant is pulled up bodily, the leaves in a little while bend backwards and downwards, so as to conceal the roots; the flower-stalks also curve themselves, and present an odd and unexpected change when, on getting home, we examine the contents of our collecting-box. Winter-buds or gemmæ are formed by this plant analogous to those of the Utricularia.

A variety, larger in all its parts, and with very handsome flowers, is found in bogs in the south-west of Ireland, and commonly distinguished as the *Pinguic'ula grandiflo'ra.* (E. B. xxxi. 2184.)

4. ALPINE BUTTERWORT—*Pinguic'ula alpi'na.*

A plant common in the arctic regions, alike of Europe and Asia, but in Britain known only upon the moors of Rosehaugh, Ross-shire, where the progress of cultivation seems likely soon to efface it. Fl. June, July.

E. B. Supp. ii. 2747.

5. PORTUGUESE BUTTERWORT—*Pinguic'ula Lusitan'ica.*

Wet moors, margins of bogs, and upon the ledges of wet and earthy rocks; chiefly upon the western side of the island, and extending from Cornwall to Cape Wrath. New Forest. Isle of Man. Abundant in Arran, between Brodick Bay and Corrie. Frequent also in Ireland. Fl. June, July.

Curtis, iv. 582; E.B. iii. 145.

GROUP III.—PERIANTH ADHERENT TO THE OVARY, AND, ALONG WITH THE STAMENS, APPARENTLY UPON THE SUMMIT OF IT. (Fig. 86, p. 52.)

CXI. THE DAISY FAMILY.—*Compos'itæ* or *Astera'ceæ.*

The Daisy family is the largest known to Botany, the estimated number of species being no less than 9,000. It is also one of the best-marked and soonest recognised, the characters presenting little variation, and lying, with a few exceptions, in very small compass. Most of the species, including the whole of those that grow in northern latitudes, are herbaceous; but towards the equator there are many of shrubby habit, and in the island of St. Helena they are chiefly trees. Some of the species are climbers, and the South American genus *Mutis'ia* is provided with tendrils! In habitat they would seem to be wholly terrestrial, nothing being on record as to aquatic species, though many are peculiar to swamps and marshy places. Very many are strikingly handsome and ornamental; as many more are inconspicuous; and not a few are pestilent weeds in the eyes of the farmer. The leaves are universally simple, and of every shape and plan of composition, from linear up to triply-pinnatifid, the only characters in which they agree throughout being the negative ones of never being compound, and never possessing stipules. The endless modifications of the "divided leaf" which they present, are referable, perhaps without exception, to the type called "feather-lobed," and include some of the most curious forms that it allows of, such as the "runcinate," found in the dandelion—a leaf which resembles a succession of broad arrow-heads, so arranged as for the point of every lower head to enter and adjoin itself to the base of the next above. Remarkably fine examples occur also of auricled and of decurrent leaves. The structure of the flowers, which are invariably Compound, was explained in the Introduction (page 35.) It may be recapitulated that they consist of a less or greater number of miniature flowers or "florets" standing side by side on a flat, or convex, or conical, or concave "receptacle" formed of the dilated summit of the general peduncle, and surrounded by a basket, which is often called the "common calyx." Every basketful constitutes a "head," and is virtually equivalent to an umbel with undeveloped or extremely short pedicels, such as that of the *Eryn'go*, which is in some respects a link between the Compositæ and the Umbelliferæ. The basket corresponds to the involucrum of the Umbelliferæ, and, for distinction sake, is sometimes called the "anthodium," as mentioned on page 37. Individually, the heads have the appearance of a single flower, and in popular idea they must needs be always so considered, since in bouquets they are practically nothing else. In truth, however, every basket contains an aggregate of five or six up to many hundreds of distinct and independent flowers—so many in the sunflower, which is probably the largest example, as to give a centre nearly a foot in diameter. The heads are variously distributed. Sometimes they are supported on solitary and radical scapes, as in the dandelion; sometimes they are collected into spikes, or cymes, or corymbs, or panicles. When the heads contain a very small number of florets, as happens in the mugwort, the golden-rod, yarrow, and many others, the panicles or cymes are usually very large. The individual florets require to be examined with a magnifying-glass, or, if possible, with a low power of the microscope. Every one of them consists of an ovary with a little corolla perched on the summit; a calyx of extremely delicate white hairs usually encircles the base of the corolla; and within the corolla, or generally so, are five stamens with long and slender anthers, which in nearly every species cohere vertically by their margins, so as to form a sheath that encloses the solitary style. From this peculiarity, Linnæus called the family *Syngene'sia.* The stigma often protrudes above the sheath, and frequently has two lobes that are very elegantly recurved. Both this part and the style furnish characters of great value for minute sectional and generic distinctions.

In shape the florets are either "tubular" (Fig. 153.) or "ligulate" (Fig. 154.) The tube is sometimes vase-like and deeply laciniated; sometimes extremely slender, in which case it is termed "filiform;" and ligulate florets are sometimes as narrow as needles. The mode in which they are disposed and associated is threefold, and furnishes the means of distributing the ordinary members of this vast family into three practical and well-defined sections, viz.:—

1. Those species in which the florets are all ligulate, as in the chicory-plant and the dandelion. (Fig. 152.)
2. Those in which the florets are all vase-like, as in the thistle. (Fig. 157.)
3. Those in which the cushion-like centre of the head is composed of tubular florets; while the ray-florets are ligulate, as in the daisy. (Fig. 155.)

But as anomalies occur, it is important to observe further that in the first or dandelion-form, all the florets are provided with both stamens and pistil; and that the style is not jointed below the stigmas. The head is nearly flat, with an inclination to concavity. Contrariwise, in the second great division, or thistle-form species, the head is usually globular or convex; the florets are often unisexual and even diœcious; the style is jointed below the stigma; and the corolla is generally much inflated below the mouth. Thirdly, in the daisy-form, the florets are erect and parallel—except in a few cases where the receptacle is conical; they are frequently unisexual; the style is not jointed, and the corolla is never inflated. The ligulate florets of these resemble a circle of petals.

These minuter characters become especially important in connection with species, some of them very common, which at first sight appear to belong to a section other than their own. Common groundsel, for example, is usually destitute of ray-florets, though every one of its congeners is daisy-form; and in the genus *Centaure'a*, which is essentially a thistle-head, nearly every species is provided with an outer circle of very large florets of the same figure and colour as the inner ones, but destitute both of stamens and pistil. The common globe-thistle or *Echi'nops* presents yet another modification, every floret having its own special fence of leafy bracts.

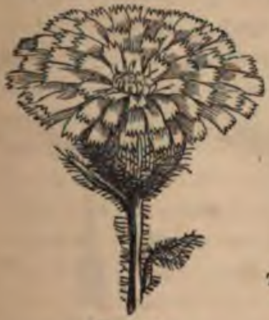

Fig. 152.

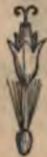

Fig. 153.
Tubular floret.

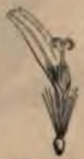

Fig. 154.
Ligulate floret.

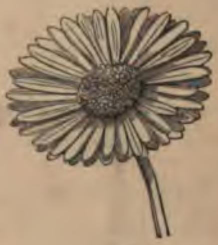

Fig. 155.

The ovary, which is one-celled, and contains a solitary and *erect* ovule, when ripe well exemplifies the seed-like form of fruit called the "achenium." In shape, it is for the most part long and slender; the surface is either glabrous and shining, or hairy, or (especially in the dandelion sub-family) grooved and transversely wrinkled, and often embossed and jewelled. The ripe achenia of nearly all the species of this sub-family furnish objects of great interest for the microscope, which also brings out their sumptuous colours. In the great majority of the family every achenium is crowned with a tuft of white or tawny hairs termed the "pappus." This crown is in reality the superior *calyx*, permanent and greatly enlarged, as happens in many other plants, and remarkable in the Compositæ only from the circumstance of its extreme tenuity. It either spreads horizontally or stands more or less erect, often forming a shallow cup, or presenting, with the achenium, the figure of a miniature shuttlecock. Ordinarily, the hairs that form it are quite simple, but sometimes they are fringed with still finer ones, and then the pappus is said to be "feathery" or "plumose." In most genera also the pappus is sessile upon the achenium, but in some it is elevated upon a pillar, as represented in Fig. 158, the pillar being developed while the achenium is in course of ripening. In this case it is termed "stipitate" or "shafted." Now and then sessile and shafted plumes occur together, as in the *Hypochœ'ris gla'bra*. The first fine day after the fruit is mature, the rays of the pappus expand, and we have the well-known white globes of the dandelion and the groundsel. So long as the atmosphere continues dry and still, the globes retain their form; and their gauzy lightness or satiny lustre in such as the coltsfoot, is of truly remarkable beauty. With rain, however, and in wet weather, their symmetry is lost; and if left untouched by this, the wind, as soon as it rises, tears away every achenium from its anchorage, wafting it away rapidly and to a long distance. In the thistles, owing to the contraction of the upper extremity of the achenium, the pappus soon becomes detached, and is encountered floating in the air as a rudderless sphere of long white hairs. The achenia of the daisy, the sunflower, the nipplewort, and many more, are destitute of pappus; in others, such as the *Bi'dens* and the French-marigold, its place is supplied by a few stiff bristles; in others again, there is only a raised border. Now and then, as in the hairy hawkbit or *Thrin'cia hir'ta*, achenia occur in the same

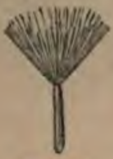

Fig. 156.
Achenium and sessile pappus.

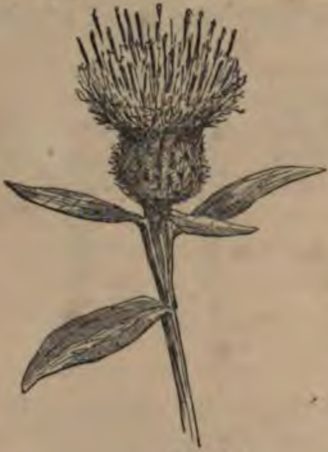

Fig. 157.

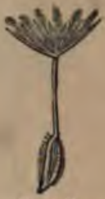

Fig. 158.
Achenium with shafted & feathery pappus.

head both with pappus and without. When all the fruit have been torn off or cast away, we see excellently the character of the "receptacle" or cushion upon which they were seated, viz., that it is only the distended apex of the peduncle. The surface is often covered with chaffy bracteas, as in the sunflower; sometimes it is dotted over with little cavities, in which the bases of the achenia have been lodged.

Lastly has to be mentioned the "basket," or anthodium, which part is either "simple" or "imbricated." It is "simple" when composed of only one row or whorl of scales, which are generally united by their margins, as in *Tage'tes;* it is "imbricated" when composed of many such rows or whorls, every successive whorl alternating with the one below. The scales are often very curious or beautiful, thorny at the points, hooked or fringed, as in many *Centaure'as;* or as in certain thistles, singularly interwoven with white fibres resembling cobweb. When the fruit is ripe, they are often reflexed. In several genera they are brilliantly coloured, so as to present the appearance of rich petals, as happens in the lovely flowers called, from their imperishable substance, "Everlastings." The finest and most intelligible example of this part occurs perhaps in the common artichoke.

Every variety of colour is found among the flowers of this vast family, but yellow greatly predominates. Most of the species reserve their beauty till advanced summer and mature autumn, which we may always discern to be fast approaching, by the profusion of their brilliant stars, whether in garden or field. The daisy, the coltsfoot, and one or two others, enliven the spring; the last flowers that give relief to the wistful eye, when it ranges round the fast-emptying borders of October, are the cheerful lilac and yellow asters of North America, and the many-hued chrysanthemums of China,—the same that, till after Christmas, are the glory of the greenhouse.

The thistle and chicory-form species seldom alter in appearance; their structure precludes it. But in the daisy-like species, when under cultivation, there is often considerable change; the tubular florets are converted into ligulate ones, producing the condition called "double," and shown so conspicuously in the chief portion of our splendid dahlias, China-asters and chrysanthemums, all of which flowers were in the original wild state shaped like daisies.

The chicory-like and the daisy-like species are exceedingly prone to close their flowers in the evening and in cloudy weather; a few kinds even close during sunshine, every species keeping to a definite hour both in its opening and its shutting. These beautiful and fascinating movements form a large part of the phenomena figuratively called the "sleep of plants," the Compositæ supplying the same kind and amount of illustration of it in their flowers that the Leguminosæ do in their leaves.

The uses of the family are as various as its forms. Very many species are medicinal, supplying tonics, bitters, and aromatics; fine dyes are yielded by the safflower and others; and a good many are available for human food, such as the lettuce, and the Jerusalem-artichoke, or *Heli-an'thus tubero'sus*, in its potato-like tubers. The proportion of species in any way deleterious appears to be exceedingly minute. The only English one of ill-repute is the *Lactu'ca viro'sa.*

Of wild and naturalised species there are in Britain 120. A large number of our common weeds are comprised among them, but many contribute greatly to the floral ornament of the country. Here belong all the thistles, with their splendid menace, afterwards so gaunt and dismal-looking: the innumerable yellow hawkweeds and their allies, the round flowers of which peer so curiously forwards; and those thrice innumerable flowers that are in shape like mounds of gold set round with milk-white rays. In E. B. there are figured, besides the above, about 20 forms which are now acknowledged by most writers to be only varieties. Recent analytical botanists have published another set of forms as "species," including no less than 20 Hieracia, so that in Mr. Babington's Manual the total is 160. Five or six are now generally excluded from the lists, viz., *Cre'pis pul'chra*, (E. B. xxxiii. 2325.) *Hiera'cium du'bium*, (xxxiii. 2332.) *H. Auric'ula*, (xxxiii. 2368.) *H. villo'sum*, (xxxiv. 2379.) *H. amplexicau'le*, (xxxv. 2490.) *Achille'a serra'ta*, (xxxvi. 2531.)

In working out species by the following key, care must be taken to look at the *lower* leaves, and at the *inner* achenia.

PRELIMINARY ANALYSIS.

Section I.—Whole plant more or less beset with very sharp-pointed spines. Flower-heads thistle-form. Florets never ligulate.

Section II.—Flowers wholly yellow. Disk-florets tubular. Ray-florets ligulate, or filiform, or vase-like; sometimes very minute—p. 432 (bottom.)

Section III.—Flowers wholly yellow; the florets all ligulate—
1st. Flower-head solitary—p. 435.
2nd. Flower-heads several—p. 436 (middle.)

Section IV.—Flowers with a yellow centre and white rays—p. 440.

Section V.—Flowers with a yellow disk, and lilac or purple rays—p. 440.

Section VI.—Florets all tubular or filiform—p. 441.

Section VII.—Flowers wholly red, orange-red, blue, lilac or white—p. 444.

Anomalous species. *(Xanthium)*—p. 445.

SECTION I.

Whole plant more or less beset with long and very sharp-pointed spines, the spines extending along the margins of the leaves and the wings of the stem. Radical and lower leaves more or less pinnatifid, the lobes often cut, and the general outline lanceolate; upper ones shorter and sometimes undivided. **Flower-heads thistle-form**; the scales of the basket usually long and numerous, and terminating in spines like those of the leaves.—Florets very numerous, all tubular, *never ligulate*, and with five deep lobes. Pappus sessile, detached from the achenium as soon as ripe, and floating away.

1. Inner scales of the basket 1—2 inches long, numerous, yellowish, glossy, and, when the atmosphere is dry, spreading horizontally, so as to resemble a flat star of linear petals. Stem erect, leafy, 3—12 inches high, bearing a solitary flower-head, or a corymb of 3—6. Outer scales of the basket edged with very prickly teeth. Whole plant remarkably rigid and juiceless.
55. Carline-thistle.

2. Flowers red, lilac, crimson, or casually white (never yellow.)
   A. Leaves very large and wavy, *the veins bordered with white*. Flower-stems 4—5 feet high. Flower-heads large, purple, solitary at the extremities of the numerous branches. Outer scales of the basket 2—3 inches long, recurved, the base broad, and with lateral spines. Whole plant perfectly glabrous. 45. Milk-thistle.
   B. Flower-heads sessile and usually solitary in the centre of a rosette of radical leaves, 6—8 inches in length. Peduncle rarely developed; when present, *destitute of prickles*, and then sometimes 2—3 flowered. Florets fine crimson. Pappus feathery. Basket not cottony.
   53. Stemless Thistle.
   C. Scales of the basket *appressed*, their points very small.
      Leaves decurrent, forming uninterrupted, wavy, and prickly wings to the stem, which is 3—6 feet high, stiff, slender, wand-like, and almost simple. Upper leaves recurved. Flower-heads in dense terminal clusters, crimson, sometimes white, sessile, small and inconspicuous. Plant deep green, blackish while young, and always growing in wet places. 47. Marsh Thistle.
      Stem 18—30 inches high and much branched. Leaves scarcely decurrent. Flower-heads numerous, *diœcious*, peduncled, forming loose corymbose clusters, pale lilac or whitish; those of the male plant nearly globular, and with the florets much projecting; those of the female oblong, and with short florets. 48. Soft Field Thistle.
   D. Scales of the basket *spreading*. Leaves *decurrent*.
      • Flower-heads in dense terminal clusters. Pappus simple.
         a. Basket globular. Plant 3—4 feet high, much branched. Flower-heads deep purple, slightly stalked. 43. Welted Thistle.
         b. Basket ovoid or cylindrical, narrower than in any other British thistle; the scales long and erect. Flower-heads sessile, pale rose-colour, the florets very few. Plant white with cottony down, and very little branched.
         44. Slender-flowered Thistle.

(PLANT PRICKLY. Flowers THISTLE-FORM, red or white. Scales of the basket *spreading*. Leaves *decurrent*.)

** Flower-heads all upon long peduncles, and mostly solitary.

† Plant *white* with cottony hairs. Stem 4—5 feet high, much branched. Flowers blueish rose-colour, solitary at the extremities of the branches. Pappus simple. Receptacle pitted. Leaves very large. 54. GREAT COTTON-THISTLE.

†† Plant green, though clothed with cottony hairs. Leaves deeply-lobed and very thorny.

a. Pappus feathery. Stem 2—4 feet high, much-branched, and many-flowered. Basket cobwebbed. Thorny lobes of the leaves pointing horizontally forwards.

46. COMMON SPEAR-THISTLE.

b. Pappus simple.

Flower-heads few, 2 inches across, half-pendulous, brilliant crimson, very handsome, and with a musky odour. Scales of the basket broadly-lanceolate.

22. NODDING MUSK-THISTLE.

Flower-heads not more than an inch across. Scales of the basket linear. Plant extremely spinous. 43. WELTED THISTLE.

E. Scales of the basket *spreading*. Leaves *not decurrent*, or only very slightly so.

* Heads sessile, or very nearly so, solitary at the ends of the branches, or 2—3 together, globular, and densely cottony. Stem 2—3 feet high and very branchy. Basket often 3 inches in diameter.—Radical leaves 18—20 inches long, the lobes in regular double ranks. 50. GREAT WOOLLY-HEADED THISTLE.

** Heads on peduncles, and not remarkable for cottony web. Stem nearly or quite simple.

Leaves deeply-pinnatifid and lobed. Flower-heads usually 2—4. Root tuberous and creeping. Stem 2 feet high.

51. TUBEROUS THISTLE.

Leaves toothed and wavy. Flower-heads solitary or rarely in pairs. Stem 12—18 inches high.

52. SMALL MEADOW THISTLE.

SECTION II.

FLOWERS WHOLLY YELLOW. DISK-FLORETS TUBULAR: RAY-FLORETS LIGULATE, OR FILIFORM, OR VASE-LIKE; sometimes very minute.

A. Flowers appearing before the leaves, very early in the spring, their stalks 3—6 inches high, and covered with scales; the ray-florets needle-shaped. Leaves broadly heart-shaped, several inches across, angular, downy underneath.

83. COLTSFOOT.

(FLOWERS WHOLLY YELLOW. DISK-FLORETS TUBULAR; RAY-FLORETS LIGULATE, OF FILIFORM, OF VASE-LIKE.)

B. Flowers appearing simultaneously with the leaves.

* Leaves *opposite*.

Leaves lanceolate, serrate, pointed, and sessile. 62. COMMON BIDENS (radiate var.)

Leaves mostly cleft into 3—5 lanceolate segments.
63. THREE-LOBED BIDENS (radiate var.)

** Leaves *alternate*.

1. Flower-heads solitary at the extremities of the branches.

Scales of the basket mostly terminating in sharp yellowish thorns. Plant 1—2 feet high, branched. Radical leaves lyrate; upper ones lanceolate and decurrent. Ray-florets vase-like and neuter.
61. YELLOW CENTAURY.

Leaves doubly-pinnatifid, the segments serrated. Stem bushy, leafy, 18 inches high. 117. YELLOW ANTHEMIS.

Leaves oblong, variously toothed and cut, and amplexicaulent.—Plant 1—2 feet high, much branched, spreading, glabrous and glaucous. Flower-heads numerous, 1½—2 inches across, brilliant yellow. Scales of the basket green, with a broad membranous border. No pappus. Annual.
110. CORN-MARIGOLD.

Leaves oblong-ovate, pointed, with a small lobe on each side, and 3-ribbed. Plant erect, slightly hairy. Ray-florets broad. Receptacle with bracts. Pappus chaffy. Annual.
108. GALINSOGEA.

Leaves ovate or oblong, rugged, serrated, veiny and amplexicaulent, the lower ones often a foot in length. Flower-heads 2 inches across, thick and solid. Scales of the basket broadly-ovate, leafy, recurved, and downy on both surfaces. Ray-florets very numerous, long, and narrow. Stem 3 feet high, leafy, and branched. Anthers with two minute tails.
103. ELECAMPANE.

Basket formed of 20—30 *linear* scales, which are equal in length and finely-pointed. Flower-stems 1—2 feet high. Blossoming early in spring. Rhizome ovate, fleshy, and transversely striated.

Radical leaves broadly ovate, cordate at the base, and with large projecting serratures. Flower-heads 3—5.
100. COMMON LEOPARDS'-BANE.

Radical leaves narrowed or wedge-shaped at the base.—Stem usually with only one flower-head.
101. PLANTAIN-LEAVED LEOPARDS'-BANE.

Leaves linear-lanceolate, succulent, fleshy, and mostly with three blunt teeth at the extremity. Stem cylindrical, 1—2 feet high. Anthers with two tails. Pappus simple and rough. Plant glabrous. 104. SALT-MARSH INULA.

(FLOWERS WHOLLY YELLOW, and appearing simultaneously with the leaves. DISK-FLORETS TUBULAR; RAY-FLORETS LIGULATE, &c. Leaves *alternate.*)

2. Flowers in *terminal corymbs,* which are sometimes almost umbellate.

‖ *Leaves divided;* sometimes very much so.

† Ray-florets flat and conspicuous.

a. Annual. Stem erect. Leaves variously pinnatifid, jagged, and toothed, the lower ones less so. Flowers few, large, loosely corymbose. Ray-florets about twelve. Pappus simple. Plant glabrous, or nearly so. 92. OXFORD RAGWORT.

b. Perennial. Stem 6—12 inches high, *decumbent at the base.* Leaves doubly-pinnatifid, the segments linear-lanceolate, and crowded. Flowers in dense corymbs, the heads very small, touching one another, and forming a flat surface. 120. GOLDEN MILFOIL.

c. Perennial. Stem 2—4 feet high, and quite erect. Flower-heads at least an inch across, and very conspicuous; pappus simple.

Lower leaves obovate and undivided; upper ones lyrate and serrated. Corymb scanty and irregular. Achenia all glabrous. Plant yellowish-green. 94. OAK-LEAVED RAGWORT.

Leaves doubly-pinnatifid, the segments crowded and overlapping. Corymb dense, with numerous flowers. Inner achenia hairy. Plant dark green. 93. COMMON RAGWORT.

Leaves simply-pinnatifid, the segments narrow, uniform, and not in contact. Achenia all hairy. 95. SLENDER RAGWORT.

†† Ray-florets minute and revolute. Annuals.

a. Plant scented.

Plant glabrous, or only slightly downy and viscid; scales of the basket 10—14. Achenia silky. 91. HEATH GROUNDSEL.

Whole plant always very viscid. Scales about 20; achenia glabrous. 90. VISCID GROUNDSEL.

b. Plant scentless. Lower scales of the basket with black tips. 89. COMMON GROUNDSEL (rayed var.)

‖‖ *Leaves undivided.*

a. Ray-florets linear and very numerous, or very minute.

Leaves short, oblong, waved, clasping the stem with rounded auricles; whole plant woolly or cottony. Stem 12—18 inches high, simple, except for the corymbose summit. Flower-heads 1¼ inch across, showy and quite flat, the earlier ones overtopped by the later. 105. COMMON FLEA-BANE.

Resembling the former, but annual, scarcely a foot high, less woolly, and the ray-florets extremely short. Flower-heads half an inch across. 106. ANNUAL FLEA-BANE.

(FLOWERS WHOLLY YELLOW. DISK-FLORETS TUBULAR; RAY-FLORETS LIGULATE, &c. Flowers appearing simultaneously with the leaves, and in *terminal corymbs.* Leaves *alternate* and *undivided.*)

b. Ray-florets flat and conspicuous. *Plant glabrous.*

Leaves linear-lanceolate, succulent, fleshy, and mostly with three blunt teeth at the extremity. Stem cylindrical, 1—2 feet high. Anthers with two tails. Pappus simple and rough. 104. SALT-MARSH INULA.

Leaves broadly-lanceolate and copiously serrate. Stem angular, 3—5 feet high. Flowers abundant and showy. 96. GREAT BROAD-LEAVED RAGWORT.

c. Ray-florets flat and conspicuous. *Plant more or less downy or cottony;* pappus simple.

† Scales of the basket all of the same size. Leaves elliptical or lanceolate.

Stem simple, 6—8 inches high. Heads 2—6. Achenia downy, with slightly elevated ribs. Perennial. 99. FIELD CINERARIA.

Stem branched, 2—3 feet high. Heads numerous. Achenia glabrous and strongly ribbed. Annual or biennial. 98. MARSH CINERARIA.

†† Lowermost scales of the basket very small. Stem 3—7 feet high, simple, except at the summit. Leaves lanceolate, sessile, sharply serrate. Heads rather few, but large and showy. 97. GREAT FEN RAGWORT.

3. Flowers in *terminal panicles,* the panicles 3—12 inches long, erect, usually crowded with bloom, handsome and conspicuous. Stem 1—3 feet high, more or less zigzag. Lower leaves elliptical; upper ones lanceolate. Ray-florets 6—10. 88. GOLDEN-ROD.

SECTION III.

FLOWERS WHOLLY YELLOW; THE FLORETS ALL LIGULATE.

1. Flower-head solitary upon the summit of a radical and usually leafless peduncle 3—12 inches high. Plant perennial.

A. Plant with prostrate and hairy branches 3—12 inches in length.—Leaves elliptical, an inch long, and entire; the upper surface green, and sprinkled with erect hairs, the lower one white and cottony. Flowers lemon-coloured, the marginal florets with a red stripe down the back. 26. MOUSE-EAR HAWK-WEED.

B. No prostrate branches.

* Basket glabrous. No bracts among the florets.

Plant glabrous. Leaves runcinate and glossy. Flower-stalk 3—9 inches high, hollow, and milky-juiced. Outer scales of the basket loosely recurved. Blossom brilliant, nearly 2 inches across. Pappus stipitate and simple; the globe of fruit 2 inches in diameter. 35. DANDELION.

(Flowers wholly yellow; the florets all ligulate. Flower-head solitary. No prostrate branches. Basket glabrous.)

Leaves hairy, lanceolate, waved, toothed, or a little pinnatifid. Peduncles glabrous. Pappus sessile and feathery. Flower-buds drooping before they open. 5. Hairy Hawkbit.

** Basket hairy.

a. Chaffy bracts among the florets. Leaves oblong, irregularly toothed, rough with short hairs and blotched with brownish-red. 10. Spotted Catsear.

b. No bracts among the florets. *Leaves all radical,* and more or less *pinnatifid* or runcinate. Pappus sessile and *feathery.*

Leaves hairy on both sides. 6. Rough Hawkbit.

Leaves glabrous. Summit of the peduncle very much enlarged. Basket shaggy with greenish-black hairs. 7β. Smooth-leaved Autumnal Hawkbit.

c. No bracts among the florets. Flower-stems leafless or at most with 1—3 leaves, which are lanceolate or ovate, and more or less toothed. Pappus *simple.*

Basket thickly clothed with long, tawny, and silky hairs. 28. Alpine Hawkweed.

Basket downy with short hairs, and a few long black ones intermingled. 29. Wall Hawkweed (var.)

2. Stems erect and branched, and with more than one head of flowers.

A. Leaves all radical, or only one or two upon the stem.

* Long and attenuated yellow bracts among the florets. Pappus feathery; achenia transversely wrinkled.

Basket hairy and bristly, large and hemispherical. Leaves oblong, irregularly toothed, rough and blotched with brownish-red. 10. Spotted Catsear (var.)

Basket nearly glabrous. Leaves oblong, lingulate, or variously toothed.

Leaves rough and hairy upon both surfaces, numerous, and forming a flat rosette that lies close upon the ground. Flower-stalks with numerous small bracteas. Pappus stipitate. *Perennial.* 8. Common Catsear.

Plant glabrous and *annual.* 9. Smooth Catsear.

** No bracts among the florets.

Annual. No pappus. Leaves obovate, toothed and rough-edged. Basket glabrous. 37. Arnoseris.

Perennial. Pappus feathery and sessile. Leaves lanceolate in outline, variously toothed or pinnatifid. Branches with many scattered and linear bracteas. Basket downy. 7. Autumnal Hawkbit.

Perennial. Pappus simple. Leaves ovate and petiolate, more or less toothed at the base. Basket rough with short, black, glandular hairs. 29. Wall Hawkweed.

(FLOWERS WHOLLY YELLOW; FLORETS ALL LIGULATE. Stems erect and branched, and with more than one head of flowers.)

B. Leaves dispersed over the plant. Florets few, *i.e.*, not more than 4–6—10–20. Flowers inconspicuous.

- Leaves without prickles in any part. Plant 1—3 feet high.
  - Florets 4—5. Leaves lyrate, the terminal lobe angled, (Figs. 25, 27—p. 15.) purple on the under surface. Panicle branched in all directions. Pappus simple. A tender and very elegant plant. 14. PRENANTHES.
  - Florets 10—16. Basket angular, glabrous, formed of about eight equal scales; hardened and vase-like when the fruit is ripe. Radical leaves lyrate, green upon both surfaces; upper ones small and undivided. Flowers in a loose panicle, the branches and peduncles all erect. No pappus. 36. NIPPLE-WORT.

** Leaves mostly sessile, the midrib prickly on the under-side. Stem 2—3 feet high. Flower-heads numerous, pale, and inconspicuous. Florets 6—10—12. Achenia flattened. Pappus abundant, stipitate, simple, very white and silky.

a. Flower-heads scattered, the whole forming a more or less leafy and spreading panicle with numerous acutely cordate bracts. Leaves obovate, finely toothed, undivided or pinnatifid. Plant full of milky and acrid juice. Achenium and beak of equal length.

Stem-leaves numerous and erect. Branches short and spreading. Achenia pale. 11. PRICKLY LETTUCE.

Stem-leaves few and horizontal. Juice very acrid and fœtid. Stem nearly simple. Achenia black. 12. ACRID LETTUCE.

b. Heads of flowers in small alternate tufts, the whole forming an almost simple spike. Leaves erect against the stem, linear, or variously divided, the margins *entire*. Achenium only one-third as long as its beak. 13. WILLOW LETTUCE.

C. Leaves dispersed over the plant. *Florets numerous.*

1. Basket with 4—5 cordate, prickly, and erect bracts outside of it.—Plant 1—3 feet high, branched, rough with short, stiff, and pungent hairs that arise from white tubercles. Leaves lanceolate, more or less toothed, and very rough. Flowers an inch across, in terminal corymbs, the peduncles short. Achenia transversely striated, the pappus of the inner ones feathery. 3. BRISTLY OX-TONGUE.
2. Leaves grass-like, 6—8 inches long, quite entire, channelled, sessile, and *quasi*-parallel-veined. Stems 1—2 feet high, erect, and branching. Flowers solitary on terminal stalks, the basket extending beyond the florets. Pappus stipitate and feathery, the head of fruit 3—4 inches in diameter. 1. YELLOW GOATSBEARD.

(FLOWERS WHOLLY YELLOW; FLORETS ALL LIGULATE. Stems erect and branched, and with more than one head of flowers. Leaves dispersed over the plant. *Florets numerous.*)

3. Leaves edged with prickly teeth, and chiefly runcinate or lyrate; a portion of them sometimes undivided and amplexicaulent. Flowers in corymbs. Basket not angular. Achenia flattened. Pappus simple, *sessile*, abundant, white, and silky.
    - *a.* Annual. Basket glabrous. Flowers lemon-coloured and inconspicuous; the basket remarkably conical after blossoming. Stem 1—4 feet high. Plant glabrous and glaucous. 17. COMMON SOW-THISTLE.
    - *b.* Perennial. Basket hairy at the base. Flowers 2 inches across, deep yellow, and very showy.
        - Cornfield plant. Stem 3—4 feet high, not much branched. Upper part rough with viscid black hairs. Auricles of the leaves short, broad, and rounded. 15. CORNFIELD SOW-THISTLE.
        - Marsh plant. Stem 6—8 feet high. Auricles of the leaves narrow and pointed. Flowers lemon-coloured. 16. GREAT MARSH SOW-THISTLE.
4. Leaves not prickly along the margin or upon the keel, and all, or at least the lower ones, more or less pinnatifid or runcinate. Pappus simple.
    - * Achenia angular, contracted at the upper end, and the inner ones at least, with a long and slender beak. Pappus usually very white. Leaves, or at least the lower ones, pinnatifid or runcinate.
        - *a.* Stem 6—12 inches high. Beak of the outer achenia scarcely developed. 20. FŒTID CREPIS.
        - *b.* Stem 1—2 feet high.
            - Leaves mostly radical. All the achenia with a long and slender beak. 19. LONG-BEAKED CREPIS.
            - Stem leafy. Plant covered with stiff, spreading hairs. Achenia beaked as in the preceding. 21. BRISTLY CREPIS.
    - ** Achenia angular, but none of them beaked.
        - Flower-heads few. Stem simple, 2 feet high. Leaves 3—6 inches long, those of the stem ovate, toothed, sharply-pointed, and clasping it with long pointed auricles.—Basket rough with black and prominent hairs, especially at the base. Plant otherwise glabrous. Pappus brownish-white. *Perennial.* 25. SYLVAN MARSH CREPIS.
        - Flower-heads numerous. Outer scales of the basket narrow-linear. Plant glabrous or nearly so. Segments of the upper leaves curving towards the apex, their edges entire. Pappus very white. *Annual.* 22. COMMON HEDGE CREPIS.

(FLOWERS WHOLLY YELLOW; FLORETS ALL LIGULATE. Stems erect and branched. Heads numerous. Leaves dispersed over the plant, the lower ones pinnatifid or runcinate, the margins and keel not prickly.)

Flower-heads numerous, and rather large, forming a broad, terminal corymb. Outer scales of the basket oblong, and bordered with white. Pappus very white and silky. 23. ROUGH CREPIS.

5. Leaves not prickly along the margin, though often serrate, and mostly *ovate*, *lanceolate*, or *linear*.

* Plant glabrous or nearly so, erect, and scarcely branched; stem-leaves amplexicaulent.

Leaves mostly entire. Achenia with about 20 fine longitudinal ribs. Pappus white and soft. 24. SOFT CREPIS.

Leaves mostly toothed. Achenia with about ten ribs. Pappus brownish or tawny. 25. SYLVAN MARSH CREPIS.

** Plant more or less hairy. Leaves nearly all radical, only one or two occurring upon the stem.

Stem-leaves sessile or nearly so, but scarcely amplexicaulent. Flower-heads frequently 20—30, but sometimes very few. 29. WALL HAWKWEED.

Leaves of the stem clasping it with broad and rounded auricles. Plant glaucous. Flower-heads always very few. 31. HONEYWORT HAWKWEED.

⁂ Plant more or less hairy. Leaves dispersed over the plant; pappus dirty white.

† Pappus feathery. Plant 2—3 feet high, with spreading and leafy branches, and rough with short coarse hairs, most of which terminate in clinging hooks. Leaves lanceolate; the upper ones stem-clasping. 4. PICRIS.

†† Pappus simple. Flower-heads numerous.

a. Stem with a rosette of ovate leaves at the base, at the time of flowering. 30. SYLVAN HAWKWEED.

b. No radical rosette at the time of flowering; upper stem-leaves *not* amplexicaulent.

Upper stem-leaves all tapering at the base, and usually narrow. Plant remarkably erect. 34. NARROW-LEAVED HAWKWEED.

Upper stem-leaves short and broad, and rounded at the base. 32. SAVOY HAWKWEED.

c. No radical rosette at the time of flowering; upper stem-leaves amplexicaulent. 33. SCOTCH HAWKWEED.

SECTION IV.

Flowers with a yellow centre, and white rays.

A. Stems procumbent, 2—4 inches long. Flower-heads solitary, on scapes 1—3 inches high. Leaves obovate. Rays often pink at the tips on the under surface. Achenia numerous and minute. No pappus. 107. Common Daisy.

B. Leaves sessile, twice or thrice pinnatifid, with numerous linear or hair-like divisions. Disk of the flower more or less convex or conical.

- * *Plant glabrous*, annual, and branchy.
  - *a.* Yellow disk of the flower conical and very prominent, and increasingly so as the flowering advances. Achenia quite destitute of a raised border. Rays reflexed at night.
    - Plant fœtid when bruised. Scales of the basket membranous at the edge. Receptacle covered with bracteas. Disk lemon-coloured. 116. Fœtid Anthemis.
    - Plant faintly aromatic. Scales not membranous at the edge. Basket nearly flat. Receptacle naked and hollow. 113. False Chamomile.
  - *b.* Disk of the flower convex, but not conical. Plant scentless or nearly so. Achenia with a raised border. Basket hemispherical. Receptacle naked. 112. May-weed.
- ** *Plant more or less downy* and hoary with minute silky hairs. Receptacle covered with bracteas.
  - Scales pointed; plant hoary, with little or no smell. 115. Cornfield Anthemis.
  - Scales obtuse, or sometimes torn at the end; plant powerfully aromatic. Stem and branches procumbent. Perennial. 114. True Chamomile.

C. Leaves oblong, pinnatifid at the base; flowers 2—3 inches across, on stalks 15 inches high, solitary, but numerous and conspicuous, the white rays very brilliant. 109. Great Ox-eye Daisy.

D. Leaves petiolate, pinnatifid, the segments ovate or oblong, and deeply cut.—Flowers in terminal corymbs, the peduncles long and leafless. Ray-florets numerous, short, broad, 2-ribbed and abrupt; the entire blossom ½—¾ of an inch across. Plant upright, branched, leafy, bitter, and powerfully scented. 111. Feverfew.

SECTION V.

Flowers with a yellow disk, and lilac or purple rays.

1. Sea-shore or tidal river-margin plant. Stem stout and succulent, not much branched, 3in.—2ft. high. Leaves lanceolate and fleshy. Flowers corymbose, showy and conspicuous. Whole plant glabrous. 87. Seaside Star-wort.
2. Dry ground and mural plants, with hairy stems and leaves.
   - Stem 6—24 inches high, erect, with abundance of axillary and mostly simple branches. Leaves scattered, ovate, or lanceolate. Flowers corymbose. Rays erect, very narrow, and scarcely longer than the disk is broad.—Pappus simple, sessile, long, and tawny. 85. Common Fly-bane.
   - Stem 4—6 inches high, usually with only one flower-head. Rays twice as long as the disk is broad, and *spreading*, with a slight upward curvature. 86. Highland Fly-bane.

SECTION VI.

Florets all tubular or filiform; the face of the flower-head consisting (really or apparently) of no more than a flat or convex disk. Ray-florets, when present, not projecting beyond the basket.

1. *Flowers* appearing *before the leaves*, very early in spring, the heads forming a dense ovoid and lilac thyrsus, 6—12 inches long, which, as the fruit ripens, becomes a pagoda 2—3 feet high. Leaves 2—3 feet across, the petioles 3—5 feet long. 81. Common Butterbur.

2. Leaves *opposite*, or mostly so.

a. Flowers dull yellow, button-like, an inch in diameter, and half-pendulous. Basket with an outer set of spreading and leafy scales. Instead of pappus, two or four stiff and erect bristles, which are rough with reflexed prickles. Plant 1—2 feet high. Leaves serrated.

Leaves all lanceolate and undivided. 62. Common Bidens.

Leaves mostly cleft into 3—5 long and lanceolate segments. 63. Three-lobed Bidens.

b. Flowers lilac. Stems 3—4 feet high. Leaves mostly with 3—5 broadly-lanceolate and coarsely-toothed lobes, the middle lobe the longest.—Flowers in dense corymbs. Pistils longer than the florets, which are not more than 5—6. 64. Lilac Hemp-wort.

3. Flowers red or purplish, and in *thistle-form heads*.

Scales of the globular basket terminating in little incurved hooks. Plant 3—5 feet high, stout, hard, rough, and coarse. Leaves broadly-cordate and wavy. Flowers unattractive. 39. Burdock.

Leaves cottony and snow-white on the under surface; the radical ones elliptical, acuminate, 6—12 inches long; those of the stem not decurrent, and all strongly ciliated. Plant 3 feet high, thistle-like, except in wanting thorns. Flower-heads large, purple or crimson, solitary, and very handsome. 49. Melancholy Thistle.

Scales of the basket with a broad brown or blackish and fringed appendage. Stems 1—2 feet high, branched and very tough. Flowers bright crimson and conspicuous, solitary on the summit of long peduncles. Lower leaves pinnatifid; upper ones oblong and sessile. 57. Hard-heads.

Leaves pinnatifid, somewhat lyrate, or lanceolate and undivided, but always very finely serrated. Stems 2—3 feet high, stiff and branched. Flowers corymbose. Inner scales of the basket linear and tinged with purple; outer ones appressed. Pappus simple. 40. Saw-wort.

Stem 3—12 inches high, simple, erect, and woolly. Leaves chiefly radical, ovate-lanceolate and sharply toothed, the under surface white and cottony. Flowers in a clustered umbel, showy, pink or purple, the anthers blue and with two tails. Pappus feathery. 41. Saussurea.

4. Leaves undivided; plant *green*, or at least without a covering of white cotton; achenia with pappus.

A. Heads small, forming a long, narrow, and leafy *panicle;* disk-florets yellowish-white; ray-florets minute and purplish. Stem stiff and erect, 1—2 feet high, glabrous, except a few scattered hairs. Leaves narrow, entire or nearly so. Annual. 84. Canadian Fly-bane.

(FLORETS ALL TUBULAR OR FILIFORM. Leaves undivided. Plant *green*. Achenia with pappus.)

B. Flower-heads in terminal *corymbs*.

‖ Plant glabrous; 6—12—18 inches high.

Leaves linear and very numerous. Stem branched. Heads bright yellow; corymb very compact. Scales of the basket numerous and very narrow. 65. LINOSYRIS.

Leaves lanceolate, entire, rather succulent. Stem usually decumbent. Heads yellow. Anthers without tails. 87. SEASIDE STARWORT (rayless var.)

‖‖ Plant rough or downy, 2—3 feet high. Leaves ovate-lanceolate, more or less crenate, the radical ones resembling those of the fox-glove, and aromatic when rubbed. Ray-florets extremely minute. Heads yellowish. 102. PLOUGHMAN'S SPIKENARD.

5. Leaves *undivided*, and usually quite entire. Plant more or less covered with white cottony hairs.

A. Leaves oblong, sessile, and in four vertical ranks. Plant 6—12 inches high, branched, singularly white. Corymbs terminal. Flowers yellow. Bracts among the florets. 66. DIOTIS.

B. Leaves scattered. Pappus simple.

* Heads numerous, forming a long, leafy, and erect *spike*, the basket brownish. Stems nearly or quite simple, 3—18 inches high. Leaves linear-lanceolate. 75. UPRIGHT BROWN CUDWEED.

** Heads in terminal *corymbs;* occasionally very few, or solitary, in which case the plant is only 1—2 inches high.

a. Heads mostly diœcious; inner scales pure white at the tips; outer ones white or pink.

Flower-stem nearly simple, 3—6 inches high, with 3—4 heads, and many procumbent flowerless shoots. A very elegant little plant. 72. MOUNTAIN CUDWEED.

Plant 2—3 feet high; heads very numerous; scales white. 73. PEARL EVERLASTING.

b. Heads yellowish; corymb leafless and very dense; scales converging. 74. JERSEY CUDWEED.

c. Scales brown; stem simple, 2—4 inches long or high; heads few or solitary; leaves cottony on both surfaces. 76. DWARF ALPINE CUDWEED.

⁂ Heads very small and numerous, and clustered mostly at the extremities of the branches, with a tuft of leaves immediately beneath every cluster.

† Leaves beneath the clusters much longer than the heads; plant 3—6 inches high, very much branched.

Outermost florets intermixed with the inner scales of the basket. 79. FRENCH CUDWEED.

Florets distinct from the inner scales. Heads greenish-brown. 77. SPREADING CUDWEED.

(FLORETS ALL TUBULAR OR FILIFORM. Leaves *undivided* and usually quite entire. Plant more or less covered with cottony hairs. Heads small and numerous, with a tuft of leaves beneath every cluster.)

†† Leaves beneath the clusters shorter or very little longer than the heads.

a. Clusters few, globular, and terminal, containing more than 20 heads. Stem branched at the summit only; the principal head sessile, being overtopped by the 2—3 lateral flower-stalks, which divide in the same manner.
78. PROLIFEROUS CUDWEED.

b. Clusters numerous, lateral and terminal, with less than ten heads.

Leaves subulate. 79. FRENCH CUDWEED.

Leaves linear-lanceolate and *flat*.
80. LEAST CUDWEED.

6. Leaves more or less deeply divided and cut. *Flowers in terminal panicles* or *racemes.*

A. Flowering-stems and branches all erect.

Stems 3—5 feet high. Leaves deeply-pinnatifid, the lobes lanceolate, pointed, and coarsely toothed; the upper surface green and glabrous, the lower one very white, and the general aspect of the foliage like that of the garden *Chrysanthemum.* Panicles of flowers 1—2 feet long, dull brownish or greenish-red. Plant scentless. Heads very small. 69. MUG-WORT.

Stems 1—2 feet high. Leaves 2—3 inches across, almost circular in outline, but deeply cut into numerous, oblong, linear, and obtuse segments. Flower-heads numerous, half-pendulous, hemispherical, and dull-yellow. Plant bushy, grayish-white in every part with fine and almost silky hairs, and evolving a powerful odour. 68. WORMWOOD.

B. Flowering-stems much-branched, 1—2 feet long, spreading or decumbent while young, ascending when the flowers are developed, and then straight and wand-like. Leaves pinnatifid and lobed, the segments narrow-linear or subulate.

Stem and leaves green or reddish. Basket ovoid and glabrous.
70. FIELD SOUTHERNWOOD.

Stem and leaves white with cottony hairs. Basket cylindrical and cottony. 71. SEASIDE SOUTHERNWOOD.

7. Leaves more or less deeply divided and cut. *Flowers in corymbs,* the florets *yellow.* Stem erect.

A. Leaves simply cut, the upper ones stem-clasping. Stem branched, 3—18—24 inches high. Flower-heads inconspicuous. Pappus forming globular white heads, half an inch in diameter.

Flower-heads cylindrical. Lower scales of the basket with black tips. Plant scentless. 89. COMMON GROUNDSEL.

Heads conical. Basket wholly green. Plant with a strong odour.
91. HEATH GROUNDSEL (rayless var.)

(FLORETS ALL TUBULAR OR FILIFORM. Leaves divided. *Flowers in corymbs*, the florets *yellow*. Stem erect.)

B. Leaves doubly-pinnatifid, 5—8 inches long, broadly-oval in outline, the lobes sharply serrate. Plant leafy, 2—3 feet high.

Plant with a powerful odour. Flowers forming a broad flat corymb of button-like heads, all of which touch one another or nearly so, the corymb often as large as the palm of the hand. 67. TANSY.

Plant scentless until bruised. Lobes of the leaves wavy and lapping over one another. 93. COMMON RAGWORT (rayless var.)

SECTION VII.

FLOWERS WHOLLY RED, ORANGE-RED, BLUE, CRIMSON, LILAC, OR WHITE.

1. Florets all ligulate. Flowers blue, violet, or rarely white.

Stems 2—4 feet high, rough with bristly hairs, branched, and exceedingly tough. Leaves runcinate, the upper ones entire and sessile. Flowers in axillary pairs, sessile, sky-blue and extremely brilliant, every head forming a little cockade 1—2 inches in width. 38. FIELD CHICORY.

Leaves very long and grass-like. Plant glabrous, 3—4 feet high. Flower-heads terminal, on long and solitary stalks. Florets dull purple, shorter than the basket, which projects beyond their extremities. Pappus feathery, the globes of ripe fruit 3—4 inches in diameter. 2. PURPLE GOATSBEARD.

Stem simple, 3 feet high, terminating in a cluster of fine blue flowers, the peduncles and calyx bristly. Leaves variously lyrate.
18. BLUE ALPINE SOW-THISTLE.

2. Florets all ligulate. Flowers very deep orange-red colour, in a dense corymb upon the summit of a nearly leafless radical stalk 3—18 inches high. Leaves oblong, pointed, entire and rough. Stem and basket covered with spreading black hairs. 27. ORANGE HAWKWEED.

3. Disk-florets tubular; ray-florets vase-like, very large in proportion, and with five or more sharp segments.

A. *Perennials*. Flower-heads solitary on long peduncles.

* Scales of the basket with a broad appendage, which is fringed with long brownish or black bristles. Flowers fine crimson.

Lower leaves more or less deeply cut: upper ones undivided and mostly entire. Scales so closely imbricated as for nothing but the brown fringes to be visible.
57. HARD-HEADS.

Leaves all deeply-pinnatifid, the lobes often toothed and cut. Scales with a visible green centre, and a fringe of black bristles. Plant 2—3 feet high. Flowers very handsome. 58. GREAT CRIMSON CENTAURY.

** Scales of the basket without fringes, but mostly ending in 3—5 minute spines of equal length. Leaves mostly linear, coarsely toothed. Stem procumbent. Flowers purple.
59. JERSEY CENTAURY.

(FLOWERS WHOLLY RED, BLUE, OR CASUALLY WHITE. Disk-florets tubular; ray-florets vase-like, very large in proportion, and with five sharp segments.)

B. *Annuals.*

Stems erect, 2—3 feet high, and much branched. Plant hoary with cottony hairs. Leaves linear or narrow-lanceolate, entire or nearly so. Flower-heads solitary at the extremities of very long peduncles. Ray-florets bright azure. Anthers dark purple. 56. CORN-FLOWER.

Stems 9—12 inches long or high, the branches prostrate or very spreading. Leaves pinnatifid, the segments few and narrow. Flower-heads sessile. Florets purple. Scales of the basket ending in stiff and spreading spines, ½—1 inch long. 60. CALTROP CENTAURY.

4. Disk-florets tubular; ray-florets ligulate.

A. Leaves roundish-cordate, petiolate, several inches across when fully grown, and finely toothed. Flowers rosy, lilac, or whitish, in a loose panicle of 12—15 heads, appearing very early in spring, and sweet-scented. Pappus simple and copious. 82. SWEET BUTTERBUR.

B. Stems 1—3 feet high. Flowers corymbose, the corymbs and heads level-topped. Ray-florets not exceeding 5—10. Blooming in late summer and autumn. No pappus.

Leaves 6—8 inches long, narrow, and doubly-pinnatifid, the segments hair-like. Flowers usually white, occasionally rose-coloured. Plant downy or hairy. 118. COMMON MILFOIL.

Leaves linear-lanceolate, serrated, and glabrous. Flowers always white. 119. SNEEZE-WORT.

ANOMALOUS SPECIES.

Plant coarse, erect, 1—2 feet high, branched, and somewhat shrubby. Leaves large, broadly-cordate, petiolate, coarsely toothed, and rough on both surfaces. Flowers in axillary and terminal clusters, green, and monœcious. Male heads with tubular florets and free anthers. Female florets two together, the basket eventually becoming an ovoid burr. 121. XANTHIUM.

HABITATS AND DISTRIBUTION.

I.—FLOWERS CHICORY-LIKE—SUB-FAMILY *Cichoria'ceæ.*

1. YELLOW GOATSBEARD—*Tragopo'gon praten'sis.*

Meadows, among the mowing-grass; common all over Britain. Fl. June. Biennial.

E. B. vii. 434; Baxter, v. 390.

The lark, when it comes to *reveillé* the early botanist, is not sooner with its sweet song than the petals are to expand; and by six o'clock, when most other flowers are still folded, this one has opened the full disk of its delicate bloom. By ten or eleven, though the sun be hot and bright, the blossoms begin to close, and in the afternoon the plant is discoverable only by its leaves. In very cloudy weather they remain open a little longer. The heads of fruit resemble those of the dandelion, but are often four or five inches in diameter, and the individual fruits the finest examples in the family of the shafted and plumed achenium. From the base to the crown they frequently measure an inch and a half; the rays are interwoven, and form a beautiful concave and circular net an inch across.

2. Purple Goatsbeard—*Tragopo'gon porrifo'lius.*

Moist meadows, especially near rivers, and at the foot of railway slopes; widely distributed, but never found in plenty, and probably of garden origin, having formerly been much cultivated for the sake of its roots, which were stewed for food. Fl. May—July. Biennial.

E. B. ix. 638.

The goatsbeards are distinguished from all our other ligulate composites, alike by the grassy form of their foliage and by the basket being as long or longer than the florets. Both species are subject to the attacks of a minute parasitic fungus, which converts the head, while still young, into a mass of purple and sooty dust.

3. Bristly Oxtongue—*Helmin'thia echioi'des.*

Borders of dry fields, waysides, and dry hedgebanks. Common in England and Ireland, but not found in Scotland. Fl. June, July. Annual.

Curtis, i. 196; E. B. xiv. 972 (both as *Pic'ris echioi'des)*; Baxter, iv. 270.

4. Picris—*Pic'ris hieracioi'des.*

Roadsides and dry borders of fields; common in England, but in Scotland and Ireland scarcely known. Fl. July, August. Biennial.

E. B. iii. 196; Baxter, iv. 274.

5. Hairy Hawkbit—*Thrin'cia hir'ta.*

Dry banks, gravelly fields, moors, and downs; very common everywhere, except in the northern parts of Scotland. Fl. July—Sept.

Curtis, iii. 423 (as *Leon'todon); E.* B. viii. 554 (as *Hedyp'nois); Baxter,* v. 323.

6. Rough Hawkbit—*Apar'gia his'pida.*

Meadows and pastures, especially near the banks of rivers; common as far north as Forfarshire. Fl. June, July.

Curtis, ii. 348 (as *Leon'todon); E.* B. viii. 554 (as *Hedyp'nois); Baxter,* iv. 318.

The bristles upon the leaves, both of this species and the preceding, are in part forked like the letter Y.

7. Autumnal Hawkbit—*Apar'gia autumna'lis.*

Dry fields and waste places; abundant everywhere. Fl. August.

E. B. xii. 830 (as *Hedyp'nois autumna'lis).*

The *Hedyp'nois Tarax'aci*, or Smooth-leaved Autumnal Hawkbit, of E. B. xvi. 1109, is a mountain variety of this plant, common in the Highlands of Scotland. The heads are larger than in the common lowland form of the plant, and for the most part solitary.

8. Common Catsear—*Hypochæ'ris radica'ta.*

Meadows, pastures, and hedgebanks, wherever there is grass, and the ground is dry. Fl. June—August.

Curtis, i. 197; E. B. xii. 831; Baxter, vi. 406.

The leaves spread in a flat circle upon the ground, and are remarkable for the variety in the wave and indentation of their margins.

9. Smooth Catsear—*Hypochæ'ris gla'bra.*

Dry and gravelly places, heaths, and in ploughed land where the soil is sandy; widely distributed, but rare, and in Ireland not hitherto observed. Fl. July, August. Annual.

Curtis, i. 198; E. B. viii. 575.

10. Spotted Catsear—*Hypochæ'ris macula'ta.*

Dry and open hill-sides, especially upon chalk and limestone; rare, and almost confined to Suffolk and Cambridgeshire. Fl. July.

E. B. iv. 225.

11. Prickly Lettuce—*Lactu'ca Scari'ola.*

Dry waste places, and on the borders of dry fields. Scattered over the greater part of England and southern Scotland, but local and rare. Fl. August. Biennial.

E. B. iv. 268.

12. Acrid Lettuce—*Lactu'ca viro'sa.*

Borders of fields upon dry and chalky soil; at the foot of old walls, in dry hedges, &c.; not uncommon. Fl. August, September. Biennial.

E. B. xxviii. 1597; Baxter, iv. 315.

Perhaps not different from the preceding.

13. Willow Lettuce—*Lactu'ca salig'na.*

Waste and dry places. Occasionally in salt-marshes. Very rare. Kent, on the banks of the Thames. Fl. August. Biennial.

E. B. x. 707.

14. Prenanthes—*Prenan'thes mura'lis.*

Woods and shady cloughs; also upon old walls, and in the little caves that shelter springs of water. Common, except in Scotland. Fl. July, August. Biennial.

Curtis, ii. 350; E. B. vii. 457; Baxter, i. 27.

A very distinct and remarkably elegant plant, the stems rising 1—2 feet high, with lyrate leaves in very curious diversity, as represented in Figs. 25 and 27, and large panicles of yellow flowers, the branches striking angularly in every direction. The heads, which are about half an inch across, contain five ligulate florets each, and resemble simple flowers of five petals.

15. Cornfield Sow-thistle—*Sonch'us arven'sis.*

Ploughed fields, among corn, beans, &c., and generally indicative of a cold and undrained soil. Common everywhere. Fl. autumn.

Curtis, ii. 273; E. B. x. 674.

The large golden-yellow blossoms rival those of the dandelion, and are borne on stalwart stems that tower above everything else in the field.

16. Great Marsh Sow-thistle—*Sonch'us palus'tris.*

Marshes near the borders of large rivers, or not far from the sea. Very rare, and apparently confined to the eastern counties. Fl. July, August.

Curtis, ii. 351; E. B. xiii. 935.

17. COMMON SOW-THISTLE—*Sonch'us olera'ceus.*

Hedgebanks, waste and cultivated ground, especially ploughed fields, and as a weed in gardens; common everywhere. Fl. June—Sept. Annual.

Curtis, i. 131; E. B. xii. 843; Baxter, ii. 147.

The Prickly Sow-thistle, or *Sonch'us as'per* (E. B. Supp. ii. 2765, 2766), is a variety, equally common, with the leaves more prickly along the margins, the auricles rounded, and the achenia destitute of the transverse ribs found in the normal form.

18. BLUE ALPINE SOW-THISTLE—*Sonch'us alpi'nus.*

Moist cliffs upon the Clova and neighbouring mountains in the Highlands of Scotland; rare. Fl. August.

E. B. xxxiv. 2425 (as *Sonch'us cœru'leus*).

19. LONG-BEAKED CREPIS—*Cre'pis taraxacifo'lia.*

Dry fields and waste places; rare, and chiefly in the limestone districts of the south of England and the south of Ireland. Fl. July, August.

E. B. Supp. iv. 2929.

20. FŒTID CREPIS—*Cre'pis fœt'ida.*

Dry fields; very rare, and found only in the south and south-east. Fl. July, August. Biennial.

E. B. vi. 406; Baxter, vi. 467 (as *Börkhaus'ia fœt'ida.*)

21. BRISTLY CREPIS—*Cre'pis seto'sa.*

A plant indigenous to the south-eastern parts of Europe, and introduced into England with the seeds of Italian rye-grass, among crops of which it now and then makes its appearance. Fl. June, July. Annual.

E. B. Supp. iv. 2945.

22. COMMON HEDGE CREPIS—*Cre'pis vi'rens.*

Meadows, pastures, dry hedgebanks, clover-fields, old walls, and often upon old cottage roofs; common everywhere. Fl. June—October. Annual.

Curtis, ii. 347; E. B. xvi. 1111 (both as *Cre'pis tecto'rum*); Baxter, v. 366.

23. ROUGH CREPIS—*Cre'pis bien'nis.*

Pastures upon chalky soil; rare, and found chiefly in the south and east. Fl. June, July. Biennial.

E. B. iii. 149.

24. SOFT CREPIS—*Cre'pis hieracioi'des.*

Dry fields and among bushes; very rare, and observed hitherto only in the north of England and the south of Scotland. Fl. July—Sept.

E. B. xxxi. 2210 (as *Hiera'cium mol'le.*)

25. Sylvan Marsh Crepis—*Cre'pis paludo'sa.*

Moist woods and cloughs, especially by splashy and mossy springs and the sides of little streams; common, except in the south. Very abundant near Manchester. About Bristol unknown, though found in South Wales. Fl. August.

E. B. xvi. 1094 (as *Hiera'cium paludo'sum.*)

26. Mouse-ear Hawkweed—*Hiera'cium Pilosel'la.*

Dry hedgebanks, tops of old walls, cottage-roofs, &c., delighting in the most sunny and drouthy situations; common everywhere. Fl. May—August.

Curtis, ii. 274; E. B. xvi. 1093.

Immediately distinguished from all our other composites by its hairy and procumbent shoots, and the pale lemon-colour of the solitary blossoms. The latter, in favourable seasons, and when in perfection, have the smell of raspberry jam. In Gloucestershire, and probably elsewhere in the south, a beautiful little green and gold beetle haunts this flower, loving to

> "Sit in the centre, and enjoy bright day,"

and at certain angles of view, is scarcely distinguishable by reason of its lustre.

27. Orange Hawkweed—*Hiera'cium auranti'acum.*

A native of the mountains of the south of Europe, long cultivated in English gardens, from which it has here and there passed into waste places and dry fields. Near Alnwick Abbey, plentiful. Fl. June, July.

E. B. xxi. 1469 (not red enough, nor are the hairs upon the basket sufficiently long and shaggy.)

28. Alpine Hawkweed—*Hiera'cium alpi'num.*

Dry and rocky places on the high mountains of Wales and Scotland; not rare. Scantily also upon those of the Lake district. Fl. July.

E. B. xvi. 1110.

29. Wall Hawkweed—*Hiera'cium muro'rum.*

Rocks, rocky ground, and walls slightly covered with crumbling earth; common all over Britain. Fl. May—October.

E. B. xxix. 2082.

30. Sylvan Hawkweed—*Hiera'cium sylvat'icum.*

Dry banks, old park-walls, and dry woods, especially where rocky, and the soil is shallow; also in mountain-glens and by streams in sub-alpine districts. Common all over Britain. Fl. June—October.

E. B. xxix. 2031.

Excepting the common bramble, perhaps no English plant is so variable as the Hieracium of which the two preceding are the salient forms, for although usually kept asunder, even these two are probably resolvable into a single species. A score of forms have been discriminated as species by Mr. Backhouse and those who adopt his views, and it is not uncommon to meet with others that seem to prefer as good a claim. Some of them may possibly be hybrids. The student who desires to explore the subject, should consult Backhouse's "British Hieracia," Babington's "Manual," or Irvine's "Hand-book." A few of these forms have been figured in E. B., viz.:—*Hiera'cium Lawso'ni*, (xxix. 2083.) *Hiera'cium macula'tum*, (xxx. 2121.) the leaves often spotted and blotched with purple; *Hiera'cium pulmona'rium*, (xxxiii. 2307.) and *Hiera'cium Lapeyrou'sii*. (Supp. iv. 2915.) The *Hiera'cium Halle'ri* of Curtis (iv. 635.) belongs to the same series. Most of them are sub-alpine, and it is not impossible that the *alpi'num* itself may be only an extreme form.

31. HONEYWORT HAWKWEED—*Hiera'cium cerinthoi'des.*

Mountains in the west and north of Ireland. Fl. summer.

E. B. xxxiv. 2378.

32. SAVOY HAWKWEED—*Hiera'cium Sabau'dum.*

Dry hedgebanks, also in thickets, woods, and groves, where the ground is dry; common. Extremely abundant about Manchester. Fl. August—October.

E. B. v. 349.

Readily distinguished among the Hawkweeds by the great abundance of its leaves.

33. SCOTCH HAWKWEED—*Hiera'cium prenanthoi'des.*

Mountain-glens, and rocky places by rivers; rare. Highlands of Scotland. Fl. August, September.

E. B. xxii. 2235.

To this species appears referable the *Hiera'cium denticula'tum* of E. B. xxx. 2122, now usually called "*Hiera'cium stric'tum.*"

34. NARROW-LEAVED HAWKWEED—*Hiera'cium umbella'tum.*

Dry hedgebanks, groves, gravelly thickets, and in shady and rocky places; common. Frequently upon the seaside sand-hills. Fl. July—September.

Curtis, iii. 422; E. B. xxv. 1771; Baxter, iii. 165.

Frequently attacked, especially when growing upon the seaside sand-hills, by an insect which causes odd tumours upon the upper portion of the stem.

35. DANDELION—*Leon'todon Tarax'acum.*

Where is it *not?* Water alone forms no part of the territory of this brilliant and flaring weed, which is in bloom more or less all the year, though most profusely in early summer.

Curtis, i. 58; E. B. viii. 510; Baxter, iii. 163.

The name "Dandelion" is given popularly to all large yellow composites, but this is the only species to which it properly applies. The flowers may be gaudy and inelegant, yet nothing can be prettier than the globes of white-plumed seeds which follow them,—"clocks" for the time-curious children, as they blow the little ships adrift into the aërial sea. In wet seasons, the autumnal leaves become doubly-runcinate, and at all times of the year individuals may be noticed in which the leaves are linear, or at least undivided. A variety with foliage of the latter kind, and the outer scales of the basket appressed while the plant is in flower, is by some botanists distinguished as *Leon'todon palus'tre* (E. B. viii. 553.)

36. Nipplewort—*Lapsa'na commu'nis.*

Hedgebanks and dry waysides; common everywhere, except in the extreme north of Scotland. Fl. June—August, but often lingering, like many others of the family, till the end of November, and then found frost-bitten. Annual.

Curtis, i. 59; E. B. xii. 844; Baxter, ii. 150.

37. Arnoseris—*Arnose'ris pusil'la.*

Dry and gravelly fields, where the soil is light; chiefly in the eastern counties. In Ireland not hitherto noticed. Fl. June—August. Annual.

Curtis, iii. 520 (as *Lapsa'na pusil'la*); E. B. ii. 95 (as *Hyose'ris min'ima.*)

38. Field Chicory—*Cicho'rium Inty'bus.*

Waste and cultivated ground, where the soil is dry and light, especially by road-sides and along the borders of sun-dried fields. Widely distributed, but nowhere common, and in Scotland not further north than Edinburgh. Fl. July, August.

Curtis, ii. 276; E. B. viii. 539; Baxter, vi. 417.

II.—FLOWERS THISTLE-FORM—Sub-Family *Cynara'ceæ.*

39. Burdock—*Arc'tium Lap'pa.*

Waste places and waysides; edges of farm-yards, about hay-stacks, and under walls, among rubbish. Common everywhere. When upon farm-land, a powerful and cumbrous weed. Fl. July, August. Biennial.

Curtis, ii. 275; E. B. xviii. 1228; Baxter, v. 333.

The heads, when ripe, readily break away from the stalk, and by means of their abundant little hooks, catch hold of our clothing the moment they are brought into contact with it. They cling with the utmost pertinacity, holding on, when we would tear them away, like an exasperated cat. The lower leaves are remarkable for the beauty of their wavy outlines, and suit artists for the foreground of their landscapes. They are the largest of any British plant except the butterbur.

A variety, formerly called *Arc'tium Barda'na* (E. B. xxxv. 2478.) or the Cobweb Burdock, is found upon mountains in the north of England. The only difference (except that the plant is rather smaller) consists in the scales of the basket being interwoven with white and cottony threads.

40. Saw-wort—*Serrat'ula tincto'ria.*

Dry fields, thickets, and groves. Common in England, but scarcely extends into Scotland, and in Ireland not hitherto observed. Abundant about Windermere. Fl. July, August.

E. B. i. 38; Baxter, iii. 174.

41. Saussurea—*Saussu'rea alpi'na.*

Mountains in the Highlands of Scotland, common; and less frequently in North Wales, Westmoreland, and Cumberland. Fl. July, August.

E. B. ix. 599 (as *Serrat'ula alpi'na*); Baxter, vi. 473.

42. NODDING MUSK-THISTLE—*Car'duus nu'tans.*

Dry waste ground, especially upon hillsides; on the green margins of little-travelled roads, and on green downs near the sea, where the turf is short, especially upon chalk and limestone. Common in the south of England, but elsewhere infrequent. Fl. July—September. Biennial.

E. B. xvi. 1112; Baxter, iii. 177.

A very handsome and showy plant. The flowers are slightly pendulous, of an exceedingly fine crimson, and sweet-scented, with somewhat of a musky smell.

43. WELTED THISTLE—*Car'duus acanthoi'des.*

Dry waste places, and about hedges. Common, except in Scotland. Fl. June—August. Annual.

Curtis, iii. 418 (as *Car'duus polyacan'thos*); E. B. xiv. 973.

The commonest form of this plant is that called by some botanists *Car'duus cris'pus*, which has clustered heads, and leaves more cottony underneath than in the rarer one or true *Car'duus acanthoi'des.* The heads of the latter are usually solitary. Mr. Babington considers it a hybrid between the "*cris'pus*" and the *nu'tans.*

44. SLENDER-FLOWERED THISTLE—*Car'duus tenuiflo'rus.*

Dry and sandy places, chiefly near the sea. Abundant in England, especially in the south-western counties; frequent also in Ireland, and extends a short distance into Scotland. Fl. June, July. Annual.

Curtis, iii. 419; E. B. vi. 412.

45. MILK-THISTLE—*Car'duus Maria'nus.*

A plant of the northern borders of the Mediterranean, now and then found half-wild in waste places and dry fields, but in all cases introduced, or truant from a garden, being often cultivated for the sake of its handsome foliage. Fl. July. Annual or biennial.

Curtis, i. 199; E. B. xiv. 976.

The white veins upon the leaves are ascribed by tradition to the bosom of the Virgin, after the manner of that more ancient fable which associated the whiteness of the lily with the breasts of Juno. Hence the specific name *Maria'nus*, or, as the earlier botanists have it, *Mari'æ.* The variegation commences with the earliest life of the seedling plant, though in an "heretical" variety, first described by Ray, it never appears. Plants of the genus *Sonch'us* and others with white sap are sometimes called by the same name, but this alone is the true milk-thistle.

46. COMMON SPEAR THISTLE—*Car'duus lanceola'tus.*

Roadsides and waste places, everywhere; one of those indomitable plants which return to the charge again and again, with such troublesome valour, overthrow them as often as we may. Fl. July—October. Biennial.

E. B. ii. 107; Baxter, vi. 410 (as *Cni'cus lanceola'tus.*)

This is the species usually believed to be the national emblem of Scotland.—(See "Titan," vol. xxvi., p. 339.)

47. Marsh Thistle—*Car'duus palus'tris.*

Borders of ditches, pond-sides, in moist hollows, and marshy meadows; common everywhere. Fl. June—August. Biennial.

Curtis, iii. 420; E. B. xiv. 974.

The only indigenous thistle which grows habitually in wet places, and distinguished by this circumstance not less than by its crowded clusters of small and sessile heads, and slender, wand-like stems, rising 4—5 feet high, branched only at the summit, and then but slightly.

48. Soft Field Thistle—*Car'duus arven'sis.*

Roadsides and waste places; everywhere. Fl. July, August.

Curtis, iii. 421; E. B. xiv. 975 (male plant.)

Thistles, more than any other class of farm-weeds, indicate habitual neglect, yet they accompany cultivation wherever practised by Englishmen, and have now become an annoyance in Australia. Many a good old proverb makes use of them. First we have the timely warning—

"He that sows not corn, plants thistles."

Sow them who may, they have only one gift for us—

"Gather thistles; expect prickles."

But life cannot go scatheless, and with so much around us to give enjoyment, it is well to be reminded now and then that—

"He that hath a good harvest may be content with some thistles."

A variety of the *arven'sis*, with the leaves nearly entire, nearly destitute of spines, and not decurrent upon the stem, is distinguished as *Car'duus seto'sus.*—Found hitherto, as regards Britain, only in the vicinity of Fife.

49. Melancholy Thistle—*Car'duus heterophyl'lus.*

Moist pastures and shady places, especially in mountainous districts. Chiefly in the north of England, Wales, and Scotland. Fl. July, August.

Curtis, iii. 521; E. B. x. 675.

50. Great Woolly-headed Thistle—*Car'duus erioph'orus.*

Dry waste ground, chiefly upon hill and mountain sides, near the sea, and upon chalk and limestone. Fl. July, August. Biennial.

E. B. vi. 386.

51. Tuberous Thistle—*Car'duus tubero'sus.*

Thickets upon the downs near Heytesbury, Wiltshire; the only known British locality. Fl. August.

E. B. xxxvi. 2562.

52. Small Meadow-thistle—*Car'duus praten'sis.*

Low wet meadows and pastures, especially among trees, and chiefly in the south of England. Felton Meads, near Bristol. Fl. June, July.

E. B. iii. 177.

"*Car'duus Forste'ri*" appears to differ only in having the leaves more divided, and in usually having several flowers upon the stem.

53. STEMLESS THISTLE—*Car'duus acau'lis.*

Dry fields and open airy downs and commons, where the turf is short. Confined apparently to the south of England. Durdham Down, Per Down, &c., near Bristol, extremely abundant. Fl. June—Sept.

E. B. iii. 161.

54. GREAT COTTON-THISTLE—*Onopor'don Acan'thium.*

Dry waysides and waste places where the soil is gravelly; occurring not infrequently in England, but probably only as a colonist. Fl. July, August. Biennial.

Curtis, ii. 349; E. B. xiv. 977; Baxter, iv. 273.

Often grown in gardens and on the borders of shrubberies, and commonly miscalled the "Scotch-thistle." (See No. 46.)

55. CARLINE-THISTLE—*Carli'na vulga'ris.*

Dry fields, open breezy downs, and on sandhills by the sea. Not uncommon in England and Ireland; in Scotland rather rare. Southport, Lancashire, very plentiful. Fl. June—September. Biennial.

E. B. xvi. 1144; Baxter, vi. 405.

The Carline-thistle is known by the long inner scales of the basket, which are straw-coloured, shining, and spread out like the rays of a star, so as to resemble the ligulate florets of a daisy-form composite. In dry weather they are horizontal; but when the atmosphere becomes damp, they rise up and form a conical penthouse over the florets, after the manner of the white rays of the daisy. Their texture is like that of "everlastings." The plant being very dry and rigid, endures through the winter; on the seaside sand-hills, the weather-beaten relics remain till spring, gray, tattered, and marrowless, and look like sentinels frozen at their posts.

56. CORN-FLOWER—*Centaure'a Cy'anus.*

Cornfields; not rare, but chiefly in the south, and possibly an emigrant originally from western Asia. Fl. July—September. Annual.

Curtis, iii. 426; E. B. iv. 277; Baxter, i. 35.

A very common flower in gardens, where the colour varies to white, red, and purple.

57. HARD-HEADS—*Centaure'a ni'gra.*

Grassy hedgebanks, and along the edges of dry fields and old pastures; common everywhere. Fl. July—October.

E. B. iv. 278.

In the ordinary form of this plant, the coronet characteristic of the genus *Centaure'a* is not developed. It is emphatically a plant of waysides and rough ground, not growing, unless exceptionally, in the open fields, and lasts in bloom till the very close of autumn. The rarer form, possessed of the coronet, often grows in dry pastures, as at Horfield, near Bristol, and is a smaller and more spreading plant, and ceases to bloom much earlier. The *Centaure'a Ja'cea* (E. B. xxiv. 1678.) is a variety still rarer, with the appendages of the scales of the basket very pale, and with a much shorter fringe, or scarcely any. The coronet is in this one always present.

58. Great Crimson Centaury—*Centaure'a Scabio'sa.*

Dry waste places, chiefly where the soil is calcareous, and upon earthy and grassy rocks and cliffs. Not uncommon in the south, but in the north of England and in Scotland rather rare. Fl. July—Sept.

E. B. i. 56.

59. Jersey Centaury—*Centaure'a as'pera.*

Dry waste places in the Channel Islands. Fl. July—September.

E. B. xxxii. 2256 (as *Centaure'a Isnar'di.)*

60. Caltrop Centaury—*Centaure'a Calcit'rapa.*

Roadsides and waste places; very rare, and seemingly confined to the south of England. Fl. July, August. Annual.

E. B. ii. 125.

61. Yellow Centaury—*Centaure'a solstitia'lis.*

Cornfields and waste places near the sea; rare. Fl. July—Sept. Annual.

E. B. iv. 243.

III.—FLOWERS DAISY-FORM—Sub-family *Leucantha'ceæ.*

[The flowers of the Bidens and of several other species belonging to the *Leucantha'ceæ* usually consist of tubular florets alone, and hence these plants would seem more appropriately placed among the *Cynara'ceæ.* But, as we have before had occasion to observe, in classing plants according to their natural affinities, *single* characters are subordinate to the *mass* of characters, and such exceptions as those before us do not falsify the general rule. The affinities of the rayless *Leucantha'ceæ* are palpably with the rayed ones, and not at all with the *Cynara'ceæ.* I have ventured to introduce here the new term *Leucantha'ceæ* in preference to the inappropriate name "Corymbiferæ," hitherto applied to this sub-family. *Leucan'themum* gives an excellent idea of the structure of the whole, and *Leucantha'ceæ* may legitimately be formed from it, like *Mesembrya'ceæ* from *Mesembryan'themum.*]

62. Common Bidens—*Bi'dens cer'nua.*

Edges of ponds and ditches, usually quite in the water, and forming dense patches of a dingy yellowish-green hue; common. Fl. August, September. Annual.

Curtis, i. 200; E. B. xvi. 1114.

Sometimes furnished with spreading ligulate florets of a bright-yellow colour, which very greatly alter the appearance of the heads.

63. Three-lobed Bidens—*Bi'dens triparti'ta.*

Waste wet places, and edges of ponds, but not like the preceding, actually *in* the water. Found also in cultivated fields where the soil is moist. Not quite so common as the *cer'nua*, but very generally distributed. Fl. August, September. Annual.

Curtis, ii. 277; E. B. xvi. 1113; Baxter, vi. 446.

Fond, like the pimpernel and many other rural plants, of sauntering into town, and lodging for a year or two in gardens, after which it disappears. Occasionally found with ligulate florets surrounding the ordinary dull-yellow button.

64. LILAC HEMP-WORT—*Eupato'rium cannabi'num.*

Banks of rivers, and in wet woods and cloughs, a great lover of the shade; common all over Britain. Fl. July, August.

E. B. vi. 428; Baxter, iii. 178.

The only British Composite with flowers not yellow, and the leaves *opposite.* Remarkable also, like the rest of its genus, for the great length of the deeply-cloven styles.

65. LINOSYRIS—*Linosy'ris vulga'ris.*

Cliffs by the sea in the extreme south and west of England, growing among coarse grasses. Fl. August, September.

E. B. xxxv. 2505; Baxter, iii. 233 (both as *Chrysoc'oma Linosy'ris.*)

66. DIOTIS—*Dio'tis marit'ima.*

Sandy and gravelly sea-coasts; chiefly in the south. Suffolk. Wales. In Ireland not found. Fl. August, September.

Curtis, iii. 522; E. B. ii. 141 (as *Santoli'na marit'ima*) *;* Baxter, vi. 499.

67. TANSY—*Tanace'tum vulga're.*

Hedgebanks and waste places, generally near rivers; common, though in some localities probably a garden outcast, being much cultivated, especially by cottagers, both as a potherb, and for its disfavour among fleas. Fl. July, August.

E. B. xviii. 1229; Baxter, i. 24.

68. WORMWOOD—*Artemis'ia Absin'thium.*

Waste ground, at the foot of old walls, especially about villages, and on river-banks. When near the sea, probably wild; but when inland, more likely a garden runagate. Fl. August.

E. B. xviii. 1230; Baxter, v. 339.

Cultivated very generally, the aromatic and bitter qualities rendering it useful both for medicinal purposes and those of domestic economy.

69. MUGWORT—*Artemis'ia vulga'ris.*

Rough borders of fields, hedgebanks, and waysides; common everywhere. Fl. August, September.

E. B. xiv. 978.

The *Artemis'ia cœrules'cens* (E. B. xxxiv. 2426.) is an exotic variety of this plant, found only in gardens.

70. FIELD SOUTHERNWOOD—*Artemis'ia campes'tris.*

Dry waste ground in the north-west of Suffolk, and the adjoining portion of Norfolk; the only British locality. Fl. August, September.

E. B. v. 338.

71. SEASIDE SOUTHERNWOOD—*Artemis'ia marit'ima.*

Salt-marshes and sandy and muddy wastes near the sea; rare, though upon all the British coasts. Fl. August, September.

E. B. xxiv. 1706.

When the racemes are more dense than usual, and the heads are erect, it is by some called *Artemis'ia Gal'lica* (E. B. xiv. 1001.)

72. Mountain Cudweed—*Gnapha'lium dioi'cum.*

Mountain heaths and pastures, sometimes descending almost to the level of the sea. In Scotland and Wales very common, and in the north of England by no means rare. Grasmere, abundant. Fl. June, July.

E. B. iv. 267; Baxter, iv. 243.

Frequent in gardens, both white and rose-coloured, *i.e.*, as to the *scales of the basket*, which it must not be overlooked, in all this genus, as in all other "everlastings," present the appearance and colour of petals. Ordinarily the leaves are white only upon the *under* surface. When both sides are white, it is the *Anten-na'ria hyperbo'rea* of E. B. Supp. i. 2640.

73. Pearl Everlasting—*Gnapha'lium margarita'ceum.*

A North American plant, extremely common in gardens, especially those of cottagers, and now naturalised in many places. South Wales. Fl. July—September.

E. B. xxix. 2018.

74. Jersey Cudweed—*Gnapha'lium lu'teo-al'bum.*

Waste places near the sea; extremely rare. Jersey. Near Belfast. Fl. July, August. Annual.

E. B. xiv. 1002.

75. Upright Brown Cudweed—*Gnapha'lium rec'tum.*

Dry gravelly and sandy ground, both where exposed and in thickets; common, except in the south-western counties. Near Manchester frequent; near Bristol unknown. Fl. August, September.

E. B. ii. 124.

The *Gnapha'lium sylvat'icum* of E. B. xiii. 913, by some called *Gnapha'lium Norve'gicum*, differs only in its shorter and more compact spike, in the darker flower-heads, and the leaves being cottony on both surfaces. Mountains in the Highlands of Scotland.

76. Dwarf Alpine Cudweed—*Gnapha'lium supi'num.*

Mountains in the Scotch Highlands; frequent. Fl. summer.

E. B. xvii. 1193 (unusually luxuriant.)

77. Spreading Cudweed—*Gnapha'lium uligino'sum.*

Moist ploughed land, and waste places where water has settled and been absorbed not long before; common. Fl. July—September. Annual.

E. B. xvii. 1104.

The whole plant is remarkably tender and soft, and when the branches are gently torn apart, still holds together by its cottony covering.

78. Proliferous Cudweed—*Fila'go German'ica.*

Dry fields, commons, and green hillocks where broom grows; frequent, except in Scotland. Fl. June, July. Annual.

Curtis, iii. 523; E. B. xiv. 946 (both as *Gnapha'lium German'icum.*)

A very curious little plant, chiefly from the elongation of the upper branches, which causes the principal heads to appear axillary. Several different species have been made out of it, as *Fila'go apicula'ta* and *Fila'go spatula'ta*, but the characters seem uncertain and insufficient.

79. French Cudweed—*Fila'go Gal'lica.*

Dry waste places in the eastern counties; very rare. Fl. summer.

E. B. xxxiii. 2369 (as *Gnapha'lium Gal'licum.*)

80. Least Cudweed—*Fila'go min'ima.*

Dry sandy and waste places; apparently scattered all over Britain, but local and rare. Fl. June, July. Annual.

E. B. xvii. 1157 (as *Gnapha'lium min'imum.*)

81. Common Butterbur—*Petasi'tes vulga'ris.*

Banks of rivers; in the little peninsulas and islands that check the current of shallow streams, and on the alluvial flats formed by their overflows; also in wet corners of old meadows, where the soil is deep and sandy, and in cloughs where the stream is apt to lose and recover its way. Common as far as the south of Scotland. Near Manchester in the greatest profusion; about Bristol very rare. Fl. April and May, before the leaves appear, or at least while they are not broader than a man's hand.

Curtis, i. 132, and iii. 527; E. B. vi. 430 and 431 (both as *Tussila'go Petasi'tes* and *T. hyb'rida*); Baxter, ii. 139.

The leaves of the butterbur are the largest produced by any plant that grows wild in our country, competing with those of the rhubarb in their vast dimensions. Growing close together, and lifted upon stalks that are seldom less than two feet long, on river-banks, and in places similarly favourable to their development, they form, when mature, thick and almost impenetrable jungles. In rich alluvial soil, by the end of summer, it is not uncommon to find them elevated and ample enough to give shelter from a shower of rain. This prodigious growth and the creeping roots necessarily gain for the plant the character of a vexatious and troublesome weed whenever it invades land set apart for tillage or pasture. The flowers, which resemble hyacinths in general figure, are among the earliest of the spring, appearing while the leaves are only beginning to unroll. The bees soon discover them, and hang busily on the honied thyrsi. Subsequently, the stems lengthen immensely, growing to the height of a yard or more; the peduncles lengthen proportionately, and by the end of May the little purple cones of two months before are converted into magnificent pagodas, crowded with globular tufts of white-plumed fruits. For a day or two they tower proudly amid the great leaves, but with the first brisk wind the "insubstantial pageant" fades, and

"Leaves not a rack behind."

The form of the plant figured in Curtis and E. B. as *Tussila'go hyb'rida* differs only in being somewhat smaller and less showy in the thyrsus, and in having a predominance of female florets.

82. Sweet Butterbur—*Petasi'tes fra'grans.*

An Italian plant, brought to this country in 1806, for the sake of its very early and sweet-scented flowers. Now naturalised in many places, as near Manchester and near Falkirk. Some of the stations recorded may be, however, for the *Petasi'tes al'ba*, also cultivated in gardens, and disposed to naturalise itself. The latter is distinguished by the absence of ray-florets. Fl. January—March.

Bot. Mag. xxxiv. 1388 (as *Tussila'go fra'grans.*)

83. Coltsfoot—*Tussila'go Far'fara.*

Moist clay land; fields that have been much ploughed; damp lanes and waysides; near springs of water; brick-fields; banks of rivers where there is little grass, &c. Very common everywhere, and often growing in large patches. Fl. March and April, before the leaves appear.

Curtis, i. 133; E. B. vi. 429; Baxter, ii. 91.

Coltsfoot is one of the earliest and prettiest flowers of the year, coming with the hazel-catkins and the leaves of the honeysuckle, when the voice of the throstle is heard from the trees—

> "And Winter, slumbering in the open air,
> Wears on his smiling face a dream of Spring."

Like the Pilewort, it is a *bona fidê* spring-flower. The snowdrop, the primrose, and the barren-strawberry, often begin to bloom in December, but the coltsfoot never appears till the season has turned. It seldom grows on truly *wild* ground, preferring rubbish and land that has been indolently cultivated, or newly turned over or disturbed, such as railway-slopes, where its golden flowers often present a spectacle no less curious than gay and cheerful, coming up where all is bare, and partaking, like the buds on trees, of the nature of a prologue. The blossoms are of a light but agreeable yellow, the ray-florets as slender as needles, and the flower-stalks woolly and covered with reddish-brown bracteas. These at once distinguish it from the dandelion, the stalk of which is both glabrous and perfectly naked. While young, the leaves are revolute, and thickly enveloped in cottony down. On the underside, in autumn, when they are broad and flat, there is often abundance of a beautiful yellow parasitic fungus, forming patches the size of one's finger-nail. The scapes come up either singly, or in groups of three to six or seven, and grow much taller after the flowers fade. The heads then droop, but as soon as mature, they erect themselves again, and turn into spheres as soft and shining as the whitest satin, and ripe just about the time of the blossoming of the yellow broom.

84. Canadian Fly-bane—*Erig'eron Canaden'sis.*

A native of North America, now naturalised in many parts of the world, and occasionally springing up in England, by waysides and upon rubbish. Fl. July—September. Annual.

E. B. xxix. 2019.

85. Common Fly-bane—*Erig'eron a'cris.*

Dry fields; dry and earthy tops of old limestone walls; also upon limestone rocks and on the seaside sand-hills. Not very common, and in Scotland rare. Fl. July—September. Biennial.

Curtis, i. 60; E. B. xvii. 1158; Baxter, iii. 166.

86. Highland Fly-bane—*Erig'eron alpi'nus.*

Moist rocks in the Scotch Highlands. Fl. July, August.

E. B. vii. 464.

Erig'eron uniflo'rus (E. B. xxxiv. 2416.) is the same plant in a less developed state.

87. Seaside Star-wort—*As'ter Tripo'lium.*

Muddy sea-coasts, salt-marshes, and on the banks of large rivers, sometimes many miles from the sea, provided the water be brackish; common. Occasionally in saline pastures far inland. Fl. August, Sept.

Curtis, iv. 636; E. B. ii. 87; Baxter, iii. 230.

88. Golden-rod—*Solida'go Virg-au'rea.*

Hedgebanks, thickets, and dry woods, loving the shelter of furze and other bushes; also upon limestone cliffs, and the slopes of dry hills. Common. Fl. July—October.

E. B. v. 301; Baxter, iii. 238.

89. Common Groundsel—*Sene'cio vulga'ris.*

Everywhere, except in woods and meadows, and especially in gardens, as an ineradicable weed, and flowering, more or less, all the year through, unconscious of seasons. Annual.

Curtis, i. 61; E. B. xi. 747.

90. Viscid Groundsel—*Sene'cio visco'sus.*

Waste places; generally diffused, but local and rather rare, and not extending far into Scotland. Fl. July—October. Annual.

E. B. i. 32.

91. Heath Groundsel—*Sene'cio sylvat'icus.*

Dry hedgebanks, especially upon the borders of cultivated moorland, and where furze, brake, or similar plants have been cut and burned the previous autumn. Generally diffused, but not common. Abundant near Manchester. Fl. July, August. Annual.

E. B. xi. 748.

A variety with the leaves more distinctly auricled and stem-clasping, has been named *Sene'cio liv'idus* (E. B. xxxv. 2515.)

92. Oxford Ragwort—*Sene'cio squal'idus.*

Old walls at Oxford, common and abundant, probably naturalised by the escape of seeds from the Botanic Garden. Similar situations at Bideford, Devonshire. Fl. June—October. Annual.

E. B. ix. 600; Baxter, i. 52.

93. COMMON RAGWORT—*Sene'cio Jacobæ'a.*

Roadsides and waste ground; everywhere. Fl. July—October.

E. B. xvi. 1130 (not good.)

In Cheshire this refulgent weed is called "Kadle-dock" and "Yellow-tops." It is a plant of remarkable powers of endurance, flourishing on arid soil where other things are overpowered by the sun, yet bearing the cold of autumn with indifference, and lasting in copious bloom till the end of November. In mild winters it lingers till February, and the brown relics of the corymbs may be found as late as April. It may at once be told from all our other Composites by the leaves, which have their numerous lobes crispy and waved.

94. OAK-LEAVED RAGWORT—*Sene'cio aquat'icus.*

Moist waysides; common everywhere. Fl. July—September.

E. B. xvi. 1131.

95. SLENDER RAGWORT—*Sene'cio tenuifo'lius.*

Dry hedgebanks and waysides; rather uncommon, especially northwards. Fl. July, August.

Curtis, ii. 356 (as *Sene'cio erucæfo'lius*); E. B. viii. 574.

96. BROAD-LEAVED RAGWORT—*Sene'cio Saracen'icus.*

Moist and swampy places in the corners of old meadows; on the borders of ill-drained country lanes, and upon the banks of large rivers. Local and rare. Banks of the Mersey, near Lymm. Ireland, in woods near Bantry. Fl. July, August.

E. B. xxxi. 2211.

97. GREAT FEN RAGWORT—*Sene'cio paludo'sus.*

Fens and ditches in the eastern counties. Fl. June, July.

E. B. x. 650.

98. MARSH CINERARIA—*Cinera'ria palus'tris.*

Ditchbanks, and marshy borders of ponds; chiefly in the eastern counties. Fl. June, July.

E. B. iii. 151.

99. FIELD CINERARIA—*Cinera'ria campes'tris.*

Dry open downs and commons, where the soil is chalky or calcareous; sometimes upon cliffs of similar substance. Abundant in Wiltshire and the neighbouring counties. Seaside rocks at Holyhead. Fl. May, June.

Curtis, iii. 526; E. B. iii. 152 (as *C. integrifo'lia*): Baxter, iii. 206.

100. COMMON LEOPARDS'-BANE—*Doron'icum Pardalian'ches.*

An old inhabitant of English gardens, originally from central Europe, and now naturalised in many places. Fl. April, May.

Curtis, iii. 524; E. B. Supp. i. 2654; Baxter, ii. 157.

101. PLANTAIN-LEAVED LEOPARDS'-BANE—*Doron'icum plantagin'eum.*

Cold mountainous meadows and pastures, and on the borders of streams; in England, like the preceding, only as a garden runagate. Fl. April, May.

E. B. ix. 630 (as *D. Pardalian'ches,* erroneously.)

102. PLOUGHMAN'S SPIKENARD—*Cony'za squarro'sa.*

Dry woods, and rocky and gravelly hill-sides, especially upon limestone. In England as far north as Westmoreland; also in North Wales; but in Scotland and Ireland not hitherto noticed. Fl. July, August. Biennial.

E. B. xvii. 1195; Baxter, iv. 290.

103. ELECAMPANE—*In'ula Hele'nium.*

Moist meadows and pastures, chiefly near old buildings and ancient gardens. Doubtfully indigenous, though now well-established in many parts, having long been cultivated as a medicinal herb. Fl. July, Aug.

E. B. xxii. 1546; Baxter, iv. 265.

104. SALT-MARSH INULA—*In'ula crithmoi'des.*

Muddy sea-coasts, salt-marshes, and on the grassy and muddy banks of large tidal rivers; occasionally also upon rocks by the sea. Chiefly upon the southern and western sides of England. Fl. July, August.

E. B. i. 68; Baxter vi. 494 (as *Limbar'da tricus'pis.*)

105. COMMON FLEA-BANE—*Pulica'ria dysenter'ica.*

Moist waysides and near ponds; frequent, especially where the land is heavy and cold. Common in England and Ireland, but in Scotland scarcely known. Near Manchester very frequent. Fl. July—Sept.

Curtis, i. 201; E. B. xvi. 1115; Baxter, iii. 170 (all as *In'ula dysenter'ica.*)

Well distinguished by its soft foliage, hoary underneath, and the numerous very slender marginal florets, which resemble those of the coltsfoot.

106. ANNUAL FLEA-BANE—*Pulica'ria vulga'ris.*

Moist and sandy waysides, especially where water has settled during the winter. Almost confined to the south-eastern counties of England. Fl. September. Annual.

Curtis, i. 202; E. B. xvii. 1196 (both as *In'ula Pulica'ria.*)

107. COMMON DAISY—*Bel'lis peren'nis.*

Meadows, pastures, and waysides, everywhere; in bloom, more or less, all the year round, but in the plenitude of its innocent beauty in early summer. There is an old saying that when the foot can be placed upon nine daisies at once, spring is at its height.

Curtis, i. 62; E. B. vi. 424; Baxter, i. 44.

The flowers, while in vigour, or until the anthers are emptied of their pollen, close regularly every evening, the ray-florets drawing together so as to form a tent over the yellow disk, and to bring their red-tipped ends all to a point. These, in early morning, make the grass seem besprent with crimson drops, which by noon disappear, the colour being confined to the under surface,—by that time again turned towards the earth. The abundant little fruits are clustered upon a conical and hollow receptacle the size and shape of the cork of a raspberry. They are destitute of pappus, but surmounted for some time by the withered corollas, which change from yellow to brownish-red. The basket not infrequently has some of its scales converted into leaves resembling those of the stem.

Many varieties occur in gardens—the double white, the double white and pink, the deep crimson double, with the florets quilled, and that curious Saturnian plant, the "hen and chickens," in which a number of smaller heads sprout from underneath the principal one.

108. GALINSOGEA—*Galinso'gea triloba'ta.*

A Peruvian plant, cultivated in this country since 1796, as an ornamental annual, though not possessed of much merit, and for a long time naturalised in the asparagus-grounds near Kew, Richmond, and Sheen. Fl. August—October.

Bot. Mag. xliv. 1895.

109. GREAT OX-EYE DAISY—*Chrysan'themum Leucan'themum.*

Among the mowing-grass, everywhere, blooming when the fields are crowded and waiting for the scythe. Often found straying upon the railway-slopes, and then forming great sheets and islands of lustrous white. Fl. June—August.

Curtis, iii. 354; E. B. ix. 601.

Concerning this magnificent flower, the Goliath of the field-daisies, see "Manchester Walks and Wild-flowers," chap. viii. The florets are so disposed upon the receptacle as to present numerous curving lines, exactly like those upon the back of an engine-turned watch-case. Other Compositæ give a similar appearance, but none so conspicuously as the *Leucan'themum.* What has the ingenuity of man ever devised that has not its prototype somewhere in simple Nature? When the flower is somewhat overblown, the disk becomes convex. In Cheshire it is called "Moon-penny;" in Scotland "Horse-gowans."

110. CORN-MARIGOLD—*Chrysan'themum se'getum.*

Ploughed fields and among corn, a showy but prejudicial weed. Common all over Britain, but in many districts less so than formerly, having been reduced by the cleaner farming, which will in time render the garden the only refuge both of this and of many other original attendants of the Cerealia. Fl. June—September. Annual.

Curtis, iii. 424; E. B. viii. 540; Baxter, iv. 306.

111. FEVER-FEW—*Pyre'thrum Parthe'nium.*

Hedges and waste places, but generally near houses or gardens, and hence doubtfully wild. Fl. July, August.

E. B. xviii. 1231; Baxter, i. 20.

Very common in old-fashioned gardens, and especially in the trim enclosures surrounding wayside cottages, where also a double variety is greatly esteemed, chiefly for rustic bouquets. In wet seasons, the scales of the basket often become greatly enlarged, and pinnatifid, like the leaves; and near the sea there sometimes occurs a variety with the ray-florets so short as to present only a white rim to the yellow disk, but projecting square and evenly, like the teeth of a little child. Contrariwise, under cultivation, the marginal florets may sometimes be found twice or thrice their usual length. The whole plant has a powerful but not unpleasant odour, though said to be offensive to bees.

112. MAY-WEED—*Pyre'thrum inodo'rum.*

Waste ground and on the borders of fields; common everywhere. Fl. June till late in autumn. Annual.

Curtis, iii. 525; E. B. x. 676.

By the seaside there is often found a variety with succulent herbage and smaller flowers. This is the *Pyre'thrum marit'imum* of E. B. xiv. 979.

113. FALSE CHAMOMILE—*Matrica'ria Chamomil'la.*

Cornfields and waste ground, waysides, and upon heaps of manure; common. Fl. May to autumn. Annual.

Curtis, ii. 355; E. B. xviii. 1232; Baxter, v. 335.

The central cushion or disk is conical and very prominent, resembling, when full-grown, a yellow acorn, and readily distinguishing this plant from the May-weed, in which the disk is only convex.

114. TRUE CHAMOMILE—*An'themis nob'ilis.*

Dry fields and sandy commons, chiefly near the sea. Wild in the south of England, but elsewhere probably an escape from cultivation. Fl. July, August.

E. B. xiv. 980.

The soothing and tonic qualities of tea made from the flowers, are well-known. For the sake of them the plant is commonly grown in herb-gardens, and in the south-east largely cultivated for the market. The smell has been from time immemorial compared to that of ripe apples, and the very name is Greek for "ground-apple." Chamomile makes delightful soft green walks for a flower-garden, only they must not be trodden upon in frosty weather. To lie down upon a bed of it, and snuff up the fragrance, is a capital cure for the headache.

115. CORNFIELD ANTHEMIS—*An'themis arven'sis.*

Dry fields, roadsides and waste places, perhaps most frequently near the sea; not very common. Fl. July. Annual or biennial.

E. B. ix. 602.

On the north-east coasts of England, and probably elsewhere, there is found a variety with succulent herbage which some botanists distinguish as *An'themis Ang'lica.* It is the same as the *An'themis marit'ima* of E. B. xxxiii. 2370.

116. FŒTID ANTHEMIS—*An'themis Cot'ula.*

Waste places and waysides; abundant in the south of England, gradually rarer northwards. Fl. July, August. Annual.

Curtis, ii. 353; E. B. xxv. 1772; Baxter, v. 328.

117. Yellow Anthemis—*An'themis tincto'ria.*

Dry fields and waste places in the eastern counties. Fl. July, Aug.

E. B. xxi. 1472.

118. Yarrow—*Achille'a Millefo'lium.*

Hedgebanks and waste places; everywhere. Fl. June—November.

Curtis, iii. 425; E. B. xi. 758.

A very pleasing variety, with the corymbs lightly bathed in rose-colour, is not uncommon. Both this and the next species have, at a first glance, much the look of umbelliferous plants.

119. Sneezewort—*Achille'a Ptar'mica.*

Dry meadows, waste places, and on the borders of cornfields; abundant everywhere. Fl. July—September.

Curtis, ii. 352; E. B. xi. 757; Baxter, i. 36.

Common in gardens with the flowers double. The abundant pollen, when the flowers are in full blow, often gives them the semblance of a yellow disk.

120. Yellow Milfoil—*Achille'a tomento'sa.*

A common and ornamental garden plant, said to have been gathered seemingly wild in Scotland and Ireland. Fl. May—August.

E. B. xxxvi. 2532; Bot. Mag. xiv. 498.

121. Xanthium—*Xan'thium struma'rium.*

Waste ground. Occasionally met with in the south of England and in Ireland, but not truly wild, being one of the weeds that accompany cultivation. Fl. July, August. Annual.

E. B. xxxvi. 2544; Baxter, vi. 461.

The magnitude and general showiness of the Composite family presignify its position in the flower-garden, of which, however, very many of the species commonly cultivated can only be considered the *bourgeoisie.* Few make their appearance before midsummer; the family, as remarked before, is, in respect of flowers, especially autumnal, though one of the gayest and most popular of the species comes early in spring. This is the plant commonly called the Cineraria, which in its innumerable varieties, red, purple, violet, white, or parti-coloured, would scarcely be supposed to be no more than patrician ragwort. Botanically, it is closely allied to the common Jacobæa of the wayside, and may in general terms be summed up as the *Sene'cio cruen'tus,* though some of the forms are perhaps hybrids between the *cruen'tus* and the *auri'tus.* Both species are natives of the Canary Islands, from which they were introduced about eighty years ago. The name of *Cinera'ria* was originally given to the large yellow-flowered *C. marit'ima,* the whole surface of which is covered with grayish-white down, the colour of wood-ashes or *cineres.* For garden-edgings and "ribbons," and for bouquets in which a dash of gray is desirable, the latter plant cannot be excelled. When old, and with plenty of branches, it makes the finest possible centre for a bed of scarlet or crimson flowers. The Dahlia, perhaps the most generally known of all exotic flowers in cultivation, is a native of Mexico, and was first brought to this country in 1789. In its original form, it consisted of no more than a yellow disk, the size of a florin, and about half-a-dozen crimson ray-florets of a broadly-elliptical shape, the diameter of the flower being about three inches. If neglected, or let run half-wild, it reverts to this form, as may often be observed in old and cottage gardens. So little was it esteemed, that the plant was soon lost, but in 1804 it was again introduced, and with that date begins the history of the culture of this marvellous flower, though it was not until 1815, when some fine varieties were imported from France, that attention was generally attracted to it. There are now many thousands of varieties, and though numbers no doubt expire every year, there is a constant accession of new ones. In diversity of colours, in the solidity and symmetry of its great rosettes, and in the long continuance of its abundant flowers, which fearlessly deck the cold days of expiring autumn, and succumb only to sharp frost, the dahlia is without question one of the most admirable gifts for which the old world is indebted to the new. Blue alone is unknown to its range of tints, and is probably unattainable. Nearly all the varieties at present found in gardens, whatever their hue or variegation, and whether flat-petaled or curly, globe-flowered or quilled, are referable to the original *Dah'lia super'flua.* Besides this, there are, however, in cultivation *Dah'lia frustra'nea*, (Bot. Mag. xx. 762.) *Dah'lia glabra'ta*, (lxvii. 3878.) and one or two others. The Chrysanthemum, that glorious ornament of the latest months of the year, is a native of Japan. It was first brought to Europe nearly 200 years ago, but, as happened with the dahlia, was neglected and soon lost. In 1790, a few plants were again received at Kew, and in the Bot. Mag. for 1796 (x. 327.) the first blossom that appeared in England was represented. From this old purple variety all the sorts now in cultivation have been successively derived. The most "fashionable" varieties are those called anemone-flowered, but none can be more lovely than the quilled and tasselled, especially when pure white or pure yellow. The little "pompone" chrysanthemum was first brought from Chusan by Mr. Fortune, and for a long time known as the "Chusan-daisy."—Another very great favourite with lovers of flowers is the China-aster. This has been known in England since 1731, and is perhaps the most beautiful of annual composites. Its perennial congeners, popularly known as "Michaelmas-daisies," the "Farewell-summer," and others, are North American, as are also the golden-rods, which are species of *Solida'go.* Sunflowers are principally from Mexico and California, and belong to the genus *Helian'thus.* The common marigold—

> ———————— That goes to bed with the sun,
> And with him rises weeping,

is from the south of Europe, and botanically *Calen'dula officina'lis.* "French-marigolds" and "African-marigolds," are species of *Tage'tes*, and come from central America. The same part of the world has supplied us with the splendid *Zin'nia.* From Texas we have the *Obelisca'ria*, remarkable for the thick, oblong, and dark-coloured disk, resembling an acorn in size and shape, and for the surrounding circle of pendulous and yellow ray-florets, chocolate-coloured at the base. Pendulous or recurved ray-florets occur in several others, as in the beautiful little blue-flowered annual *Kaulfus'sia amelloi'des*, a native of the Cape of Good Hope, and in the very handsome *Echina'cea* or *Rudbeck'ia purpu'rea*, (Bot. Mag. i. 2.) *Sphenog'yne specio'sa*, *Stiff'tia chrysan'tha* (lxxv. 4438.) *Triptil'ion cordifo'lium*, and a host of other annuals, all very pretty, are from the southern portion of the American continent. *Coreop'sis*, (v. 156.) *Cos'mea*, (xli. 1689.) *Callichro'a*, (lxv. 3719.) and another host, come, like several named before, from the northern portion. The very odd-looking *Farfu'gium gran'de*, grown chiefly for its leaves, which are roundish, several inches across, and dark-green with yellow blotches, is a recent introduction from China. The flowers of this plant resemble those of the butter-bur, and are borne in a small panicle of six or eight. *Centaure'as*, which are very numerous, are, like the British species, distinguishable at a glance by their handsome coronets of vase-like and neuter florets. *Centaure'a moscha'ta*, the "Yellow Sultan" of the seed-shops, is one of the most beautiful plants in cultivation; the large blue *Centaure'a monta'na* is one of the commonest and most old-fashioned. "Everlastings" are partly Australian, partly from the Cape of Good Hope. From Australia we have the well-known *Rhodan'the Mangle'sii*, rose-coloured and silver, the white *Ammo'bium*, (li. 2459.) the pink *Acroclin'ium*, the *Mor'na el'egans*, and several species of *Helichry'sum*. The finest of the Cape species are the flannel-leaved *Astel'ma exim'ia*, the globular heads of which resemble raspberries; and the unrivalled *Phænoc'oma prolif'era*. The crimson stars of the latter come out at the tips of long and slender branches of a grayish hue, but crusted all over with little dark-green leaves that look like warts. Magnificent deep golden-yellow *Helichry'sums* also come from the Cape, along with the universal *Aphelex'is*, which, in habit and form of flower, resembles the *Phænoc'oma*, but is distinguished by its linear leaves. Many brilliant species of *Gnapha'lium* have also been brought from the Cape, including that one so well-known as a dried ornament for vases in winter, and which in Paris is wrought into tens of thousands of obituary chaplets for *Père la Chaise*. *Hu'mea el'egans* is of the nature of an immortelle, though not like one in general aspect. The great crimson panicles of this plant, rising 3—6 feet high, render it, whether living or dried, absolutely incomparable for the adornment of porticoes, terraces, and halls. The heads are infinitessimally small, and contain only two or three florets each; the leaves have a strong and rather unpleasant odour, especially perceptible after rubbing the under surface. It was introduced from New South Wales in 1800. Climbers and trailers among the Composites are represented in a few South American species, but ordinarily they are plants of very little beauty of flower. *Sa'mea scan'dens* (xlvi. 2062.) is quite devoid of interest; *Gynox'ys fra'grans* (lxxvi. 4511.) has yellow and scented flowers; *Mutis'ia specio'sa* (liv. 2705.) has *quasi*-pinnate leaves, bearing tendrils at their extremities, like a pea, and red flowers with about 16 recurved ray-florets, borne singly upon long terminal peduncles. Perhaps the best of this class in cultivation is the *Mika'nia scan'dens*, not, indeed in respect of its flowers, but as a foliage-plant. The leaves are lobed, ivy-like, and of a most delicate and glistening light-green; the branches, if the plant be placed in a suspended basket, hang down in graceful ringlets of three or four feet in length. It forms a beautiful ornament also for an indoor trellis. Of gray and silvery-leaved plants suitable for borders and edgings, the Compositæ contain more than any other family. The *Cinera'ria marit'ima* has been mentioned above. *Centaure'a candidis'sima* literally glitters with silvery frost-work. *Artemis'ia glacia'lis*, *argen'tea*, and *Canarien'se*, especially the last-named, are charming plants for silvery front-lines. *Achille'a Claven'næ* (xxxii. 1287.) *Santoli'na rosmarinifo'lia*, several *Gnapha'liums*, especially *candidis'simum* and *lana'tum*, and the half-British *Antenna'ria margarita'cea* or pearl-everlasting, are likewise very good. It is a great recommendation to the Antennaria, when used for edgings, that no snail, slug, or caterpillar ever touches it. None, however, of these white-leaved plants are prettier than the little *Leon-*

topo'dium vulga're (xlv. 1958.) in its abundance of soft and tufted silky heads. Fine examples of silvery foliage among plants that require the greenhouse almost constantly, are found in the *Gnapha'lium proteoi'des* and *albes'cens*, which are almost as white and silky as the *Leucaden'dron*. Valuable as supplying another bold contrast of colour, is the gray-blue half-mourning tinted *Ager'atum Mexica'num* (lii. 2524.) This otherwise uninteresting flower, fit emblem of "mitigated grief," has now acquired the universality of the scarlet verbena. The large broad corymbs are made up of heads containing only tubular florets; the scent is peculiar and not agreeable. Originally the name was applied to a different plant, now called *Athana'sia an'nua*, and by some botanists *Lo'nas inodo'ra* (xlix. 2276.) Either appellation is well deserved by the latter, the corymbs of small yellow heads remaining unchanged upon the plant, though still alive, from July to the end of October. There is an especially beautiful class of Composites in which the flowers present two or three distinct circles of colour, or at least a dark centre and a broad border of some strikingly-contrasted hue. Several of the genus *Coreop'sis* are of this character, especially the splendid *C. tincto'ria*. The *Gaillar'dia bi'color* (lxiv. 3551.) is crimson in the centre, while the border is deep yellow; *Tol'pis barba'ta* (i. 35.) a very old favourite, is yellow with a purple eye; *Ma'dia ele'gans* (lxiv. 3548.) has a blood-coloured spot at the base of every one of its yellow ray-florets; *Gaza'nia splen'dens* has a similar ring of white or gray spots at the base of its deep orange rays. This deservedly popular plant, in its deep-green leaves, white underneath, and long and trailing branches, does far better in a suspended basket than in the flower borders. Garden thistles include, besides the *Onopor'don* and the *Maria'nus*, the tall and handsome *Car'duus Monspelien'sis;* the very curious *Car'duus Casabo'næ*, the leaves of which have their spines in sets of three at short distances along the margin; and the splendid *Car'duus a'fer*, (xlix. 2287.) a kind of great purple Carlina. Lastly, in some Composites there is an extraordinary development of a particular portion of the flower, as happens in the styles and stigmas of *Prenan'thes al'ba*; (xxvii. 1079.) others are remarkable for quaint stems and foliage, as happens with the *Caca'lia*, the nearly naked stems of which resemble green candles; others again are remarkable for perfectly spherical heads, such as occur in the genus *Echi'nops* (xxiv. 932, xlvii. 2109, &c.)

Of the economic plants of the family common in gardens, the chief, in addition to those mentioned above, are the common artichoke, *Cyna'ra Sco'lymus*, the heads of which, if allowed to proceed to bloom, open out a great thistle-form tuft of mauve; the cardoon, *Cyna'ra Cardunc'ulus;* the lettuce, *Lactu'ca sati'va;* costmary or *Balsami'ta vulga'ris*, and tarragon or *Artemis'ia Dracunc'ulus*. Common southernwood is the *Artemis'ia Abro'tanum*, a plant scarcely ever seen in flower, as is the case also with the Jerusalem-artichoke or *Helian'thus tubero'sus*. Endive is the young plant of *Cicho'rium Endiv'ia*, the same which supplies the roots that, when dried, cut up, roasted and ground, become the chicory used to adulterate coffee. The native country of this plant is probably India. The medicine called "Arnica" is prepared from the *Ar'nica monta'na*, (xlii. 1749.) a species indigenous to the southern parts of Europe. The fine orange-red dye-stuff known as "safflower" consists of the dried florets of the *Carth'amus tincto'rius*, an Egyptian plant, largely cultivated in China and the Levant, from which latter the chief import takes place.

CXII. THE VALERIAN FAMILY.—*Valeriana'ceæ.*

Herbaceous plants, 6 inches to 4 feet high. Leaves opposite, simple, undivided, or pinnatifid. Inflorescence usually cymose. Flowers small, but numerous, and often gay, from their plenty and lively colours, which are usually shades of red or pink. Corolla usually irregular, tubular, with generally five lobes, and sometimes a spur or protuberance at the base. Stamens 1—5, inserted in the tube of the corolla; stigmas 1—3. Fruit small and dry, resembling an achenium, and containing a solitary ovule, and in some species, with two additional but abortive and empty cells. The calyx (which, as in all the other families of this group, is adherent to the ovary, and thus appears to grow upon its summit) is either membranous, or like that of such Compositæ as have the fruit crowned with a sessile plume. Here, however, in the latter case, while young, it is curved inwards, and almost imperceptible, as shown in Fig. 159, not unrolling until the fruit is nearly ripe, when it becomes the coronet of feathery hairs by which the resemblance is established, and which is represented in Fig. 160. Some species are twining; many are either strong-scented or aromatic, and in their roots tonic, bitter, antispasmodic, and vermifugal. The family belongs chiefly to the temperate parts of the old world and of South America.

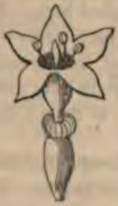

Fig. 159.
Flower of Valerian
(Magnified and showing the incurved calyx).

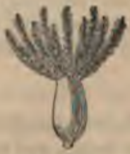

Fig. 160.
Fruit of Valerian
(Magnified and the calyx unrolled).

Eight species grow wild in Britain, and one or two others are partly naturalised.

A.

Flowers with only one stamen. Corolla with a spur at the base. Calyx expanded into feathery pappus when the fruit is ripe.

Stems stout, 1—2 feet high. Leaves ovate-lanceolate, entire or very slightly toothed. Flowers deep crimson, sometimes pink, rarely white, densely clustered into cymes which, in the aggregate, form very handsome, erect and terminal panicles. Whole plant perfectly glabrous and often glaucous. 1. Great Crimson Valerian.

Radical leaves ovate and entire; stem-leaves pinnatifid. Flowers in small panicles. Corolla pink. Spur very short. 2. Small Annual Valerian.

B.

Flowers with three stamens. No spur at the base of the corolla. Calyx expanded into feathery pappus when the fruit is ripe. Stems erect and nearly simple. Leaves more or less pinnatifid or *quasi*-pinnate. Flowers pale pink or whitish.

Leaves broadly-cordate, 4—6 inches long and wide, and coarsely toothed, the upper ones with one or two pairs of small lobes. Stem 3—5 feet high.—Flowers in large, flat, terminal corymbs. 5. PYRENEAN VALERIAN.

Leaves all pinnatifid, with 4—10 pairs of narrow segments, which are serrated and 1—2 inches long; the upper leaves few and their segments symmetrical. Stem 2—4 feet high, furrowed, and more or less hairy at the base. Corymbs several inches across, terminal and lateral. Flowers usually lilac or pale rose-colour. 3. GREAT LILAC VALERIAN.

Lower leaves ovate, petiolate, and undivided; upper ones lyrate and irregularly-pinnatifid. Stems seldom more than 6—12 inches high. Flowers generally unisexual and diœcious; the corollas of the male ones much larger than those of the female, and the corymbs broad, flat, and spreading; the female plant not so tall, but more robust, and the corymbs very dense and capitate. 4. SMALL ROSE VALERIAN.

C.

Slender annuals, with the stems much forked and branched, seldom exceeding 12 inches in height, and often not more than 2—3 inches. Fruit with a slight rim or border instead of pappus, or sometimes quite without. Flowers very minute, pale blueish, the cymes very compact, and in young plants often not more than half an inch across. Leaves narrow-oblong and undivided.

Stem branched from the base, 3—6 inches high. Fruit compressed, without any perceptible border on the summit, and 3-celled; two of the cells abortive, and the fertile cell corky at the back. 6. COMMON CORN-SALAD.

Stem branched chiefly towards the upper part.

Fruit ovoid, without any perceptible border on the summit, and 3-celled. Two of the cells abortive, and the fertile one not corky. 7. KEEL-FRUITED FEDIA.

Fruit crowned by a small, oblique, and tooth-like border.

Fruit compressed. No abortive cells. 9. NARROW-FRUITED FEDIA.

Fruit broadly-ovoid, and with three cells, two of which are abortive and larger than the one with the ovule. 8. ROUND-FRUITED FEDIA.

HABITATS AND DISTRIBUTION.

1. GREAT CRIMSON VALERIAN—*Centran'thus ru'ber.*

Old walls, especially of gardens and rustic buildings in the neighbourhood of the sea, and upon limestone, also in chalk-pits; a native of the south of Europe, long cultivated in English gardens, and now naturalised. Isle of Wight; Cornwall; Devonshire; Somersetshire, Kent, &c., very abundant. Fl. all summer, and, in sheltered situations, more or less all the year.

E. B. xxii. 1531; Baxter, ii. 90 (both as *Valeria'na ru'bra.*)

2. SMALL ANNUAL VALERIAN—*Centran'thus Calcit'rapa.*

Naturalised in dry fields at Eltham in Kent. Fl. June—Sept.

3. GREAT LILAC VALERIAN—*Valeria'na officina'lis.*

Moist ditch-banks, river-sides, and swampy places in woods; common. Fl. July—August.

Curtis, ii. 307; E. B. x. 698.

A beautiful and interesting plant, especially in its curious fruit, the feathered rays of which are mostly eleven in number.

The E. B. figure represents a form of the plant which has fewer and broader segments to the leaves, and is by some authors called *Valeria'na sambucifo'lia.*

4. SMALL ROSE VALERIAN—*Valeria'na dioi'ca.*

Marshy and swampy places, and low, undrained meadows; common in England, and extending into the south of Scotland, but in Ireland not hitherto observed. Fl. May, June.

Curtis, ii. 220; E. B. ix. 628.

These two plants, and the next, are remarkable, like the *Mon'tia*, for their three stamens to a five-parted corolla.

5. PYRENEAN VALERIAN—*Valeria'na Pyrena'ica.*

Woods in Scotland, particularly about Edinburgh and Glasgow; also in woods in the west of England. Fl. July.

E. B. xxiii. 1591.

6. COMMON CORN-SALAD—*Fe'dia olito'ria.*

Dry hedgebanks, cornfields, and waysides in light soil; not uncommon. Fl. May, June. Annual.

Curtis, ii. 296; E. B. xii. 811 (both as *Valeria'na Locus'ta.)*

7. KEEL-FRUITED FEDIA—*Fe'dia carina'ta.*

Dry hedgebanks; rare. Fl. May, June. Annual.

E. B. Supp. ii. 2810; Baxter, vi. 432.

8. ROUND-FRUITED FEDIA—*Fe'dia Auric'ula.*

Dry cultivated land; not uncommon. Fl. July, August. Annual.

E. B. Supp. iii. 2809.

9. NARROW-FRUITED FEDIA—*Fe'dia denta'ta.*

Cornfields; in the west of England not infrequent. Fl. June. Annual.

E. B. xx. 1370 (as *Valeria'na denta'ta.)*

Fe'dia eriocar'pa is a variety with pilose fruit, said to have been noticed in Worcestershire and Shropshire.

In gardens, besides the species named above, there are one or two exotic Valerians, and the very curious little *Fe'dia Cornuco'piæ*, so named from the great distension of the upper part of the stem, and the compact character of the inflorescence, which seems as if flowing out of a "horn of plenty." *Patrin'ias* have yellow flowers, as *P. Sibi'rica* and *P. Ruthen'ica* (Bot. Mag. xix. 714, xlix. 2325.)

CXIII. THE SCABIOUS FAMILY.—*Dipsaca'ceæ.*

Herbaceous plants, 1—6 feet high, in foreign countries sometimes under-shrubby. Leaves opposite, simple, undivided, or pinnatifid. Flowers numerous, usually small, collected, like those of the Daisy-family, into dense terminal heads, which are either conical or hemispherical, and are surrounded by a many-leaved involucrum. Peduncles of the heads usually 6 or 8 inches long. Calyx resembling that of the Composites; corolla resembling that of the tubular florets of the same plants, but irregular, and often only four-lobed. Stamens four, their anthers wholly unconnected, and often with long filaments, which throw up the anthers like a fine lilac or white powder on the mass of blossoms. Ovary solitary and one-celled, with a solitary ovule; stigma undivided; fruit an achenium, crowned as in the Composites, by the permanent calyx. Occasionally, as in the *Scabio'sa Cauca'sica*, the marginal florets are so large, and the central ones so small and depressed, as to render the head concave instead of convex. In the *Mori'na Per'sica*, an exceedingly rare plant, resembling the Acanthus, the reddish-white and diandrous flowers are borne in whorls. And further, the heads of the *Dipsaca'ceæ* are in some cases closely simulated by abnormal *Umbellif'eræ*. The latter are infallibly detected by their alternate leaves; besides which, in the *Dipsaca'ceæ* every floret has a small involucrum of its own, having the appearance of an inferior calyx.

About 150 species are known, natives principally of the countries bordering the Mediterranean. Their properties are unimportant, but the flowers, which are lilac, white, rosy, purple, or yellowish, are often gay and ornamental.

Five grow wild in Britain.

A.

STEM, FLOWER-STALKS, AND RIBS OF THE LEAVES MORE OR LESS SPRINKLED WITH PRICKLES, or very stiff and pungent hairs.

Flowers pale lilac, embedded among stiff bracts, and collected into an ovoid head 3—4 inches long, the head encompassed and overtopped by the long, curving, and leafy scales of the involucrum. Stem 3—5 feet high, stout, rough, and branched. Leaves long, lanceolate, and sessile; the upper ones connate, forming a cup round the stem, and collecting rain-water in considerable quantity. Flowers opening first in the middle zone of the head, and expanding in irregular patches. 1. WILD TEASEL.

Flowers white, in globular heads an inch in diameter. Stem 2—4 feet high, covered with stiff white hairs; leaves lyrate and coarsely toothed, or broadly-elliptical, with a pair of small wings at the base. Anthers much protruded. Involucrum reflexed. 2. SHEPHERDS' ROD.

B.

STEMS, &c., WITHOUT PRICKLES.

Stem 2—3 feet high, bristly, and not much branched. Leaves very variable; the lower ones lanceolate, pointed, and undivided; the upper ones toothed and pinnatifid. Heads of flowers an inch and a half across; outer florets much larger than the central ones, 4-cleft, and often without perfect stamens, and all of a delicate lilac or peach colour. 3. GREAT FIELD SCABIOUS.

Stem 6—18 inches high. Leaves all ovate-lanceolate and undivided, or nearly so. Heads of flowers hemispherical, button-like, blueish-purple or deep violet, occasionally white. Florets 4-cleft, and all, or nearly all, of the same size. 4. PURPLE AUTUMN SCABIOUS.

Stem 6—18 inches high. Heads hemispherical, delicate lilac. Radical leaves lanceolate and obtuse, sometimes ovate or lyrate, and slightly serrated; remainder pinnatifid, the segments linear, and the whole of the upper foliage very delicate. Florets unequally 5-cleft, the outer ones larger. 5. LILAC ROCK SCABIOUS.

HABITATS AND DISTRIBUTION.

1. WILD TEASEL—*Dip'sacus sylves'tris.*

Waysides and hedgebanks, especially where rather moist. Common in the south of England, but gradually diminishing northwards, and there more frequent as a garden curiosity than as a wild plant. Fl. July. Biennial.

Curtis. i. 154; E. B. xv. 1032; Baxter, vi. 490.

In the wild state of this plant the bracts which compose the head are *straight* at the extremity. In the cultivated form (sometimes distinguished as *Dip'sacus Fullo'num*, E. B. xxix. 2080.) they are *hooked*. The heads of the latter are used in dressing woollen-cloth, and in some parts of England, as Yorkshire, Somersetshire, and Gloucestershire, are raised in considerable quantities. The plant is also a little cultivated in Wiltshire. In these counties it is often semi-wild on ditch-banks and the borders of fields. The great brown prickly cones remain on the plant all through the winter, rejected even by the thorn-munching ass.

2. SHEPHERDS' ROD—*Dip'sacus pilo'sus.*

Moist and shady places, especially near rivers, and upon their banks, and preferring limestone. In the middle and south of England not uncommon; in Scotland and Ireland not hitherto noticed. Frome Glen, near Bristol. Fl. July—September. Biennial.

Curtis, i. 10; E. B. xiii. 877.

A flower with much more the aspect of a white Scabious than of a Dipsacus.

3. GREAT FIELD SCABIOUS—*Knau'tia arven'sis.*

Dry meadows and pastures, railway-slopes, edges of cornfields, and waysides; common all over Britain. Fl. June, July.

Curtis, ii. 230; E. B. x. 659 (both as *Scabio'sa arven'sis*); Baxter, iii. 179.

This beautiful wild-flower accompanies the great ox-eye daisy in its bloom, and is a charming ornament of the edges of hayfields till swept away by the mower. It is remarkable as showing the gradual transition from undivided to pinnatifid, and even to pectinate, leaves. A white variety is met with occasionally.

4. PURPLE AUTUMN SCABIOUS—*Scabio'sa Succi'sa.*

Moist and heathy pastures, and banks in dry woods; common. Very abundant near Manchester. Fl. August—October.

Curtis, i. 155; E. B. xiii. 878 (too blue); Baxter, iv. 277.

By some deemed generically distinct, and called *Succi'sa praten'sis.*

5. LILAC ROCK SCABIOUS—*Scabio'sa Columba'ria.*

Dry pastures, and more especially upon dry and rocky banks, where there has never been any cultivation. Common in England and the south of Scotland, but not found in Ireland. Settle, very abundant. Dovedale. St. Vincent's Rocks. Fl. June—August.

E. B. xix. 1311.

The garden representatives of the family comprise species of *Cephala'ria, Asteroceph'alus,* and *Scabio'sa.* The *Asteroceph'alus atropurpu'reus* or *Scabio'sa atropurpu'rea,* (Bot. Mag. vii. 247.) is common and highly beautiful. The stems are slender and very much branched, the peduncles a foot or more in length, and the flowers of a rich crimson-claret colour, the outer florets much larger than the inner ones, and the head sprinkled with white anthers. The scent is like that of honey. Varieties occur with rose-coloured flowers and with white ones.

CXIV. THE CAMPANULA FAMILY.—*Campanula'ceæ.*

Herbaceous plants, with a tendency here and there to become shrubby, the sap often milky. Leaves almost always alternate, simple, generally undivided, linear, ovate-cordate, or angularly-roundish, often deeply toothed, generally acute, and always without stipules. Inflorescence various. Calyx usually of five sepals, which are more or less combined; corolla usually of five united petals, either more or less bell-shaped, or saucer-form, and inserted upon the upper part of the calyx. Stamens springing from within the base of the corolla, equal in number to the petals, but never twice as many; the anthers usually linear, and generally much longer than the filaments, which are often much dilated at the base. Ovary solitary, inferior, 2—5-celled. Style solitary, tall, and usually covered with hairs, which collect the pollen. Stigmas as many as the cells of the ovary; generally long, linear, curling outwards, and velvety on the surface next the petals. Fruit a dry capsule, often almost globular, sometimes prism-shaped, crowned by the withered calyx and corolla, and opening by irregular lateral apertures, or by valves at the upper part; seeds numerous, minute, and often glossy. The flowers are in almost every instance blue, sometimes diluted down to white; red and yellow are nearly unknown among them. They are prone to become double, and appear to be uniformly scentless. In *Jasi'one* the anthers cohere at the lower part, so as to form a tube round the style, as in Composites. The genus *Michaux'ia* has the parts of the flower in eights or tens; in the genus *Canari'na* they are in sixes; *Cy'phia volu'bilis* from the Cape of Good Hope, is a twiner; *Phyteu'ma pinna'tum* has pinnatifid leaves.

Several hundred species are known, natives chiefly of the north of Asia, Europe, and North America, and through the beauty of their flowers greatly ornamenting the countries in which they grow. The juices are rather acrid, but the properties are, on the whole, insignificant.

Thirteen species occur in Britain, all with blue flowers, though white varieties have been noticed of the greater portion. In most of them the lower leaves are broad, while the upper ones are narrow, and could scarcely be supposed to belong to the same plant.

A.

COROLLA FLAT OR SAUCER-SHAPED, the lobes broad and short. Anthers unconnected. Plant prostrate at the base, the branches rough, 6—8 inches long. Leaves oblong, wavy at the margins. Flowers few, sessile in the upper axils, purple, spreading very widely in sunshine. Style glabrous. Capsule prism-shaped, crowned by the five permanent, leafy, and spreading sepals. 3. SPECULARIA.

B.

LOBES OF THE COROLLA NARROW-LINEAR AND VERY DEEP. Flowers in heads.

* *Anthers united at the base*, and projecting beyond the corolla. Flowers light blue, the heads dense, terminal and solitary, mostly an inch across, and with a basket underneath, the peduncles very long and erect. Florets on short pedicels. Stems and branches numerous, 6—18 inches high, more or less decumbent, leafy and hairy at the lower part, naked and glabrous at the upper. Leaves linear, wavy, and rough. Style long and club-shaped. Capsule 2-celled. 1. JASIONE.

** *Anthers unconnected.* Corolla, while in the bud state, long, cylindrical, and *curved*, the five segments not always separating at the upper part. Stigmas 2—3. Head solitary and terminal.

Flowers deep blue, the head dense and globular. Style long and purple. Stem 6—18 inches high. Leaves oblong or lanceolate. 12. ROUND-HEADED PHYTEUMA.

Flowers pale and dull blue or yellowish-white. Head ovoid at first, subsequently elongated into a dense spike 2—3 inches in length.—Lower leaves, including the petioles, 3—6 inches long, and an inch broad. 13. SPIKED PHYTEUMA.

C.

COROLLA BELL-SHAPED, THE LOBES BROAD AND SHORT. ANTHERS UNCONNECTED.

A. Stems prostrate, 6—12 inches long, weak, thread-like, much branched and entangled. Leaves *all* petiolate and cordate, with angular lobes. Peduncles longer than the leaves. Flowers delicate pale blueish-purple, half an inch long, drooping at first, afterwards nearly erect. Stigma simple. Capsule half-superior, almost globular, opening by three valves at the summit, the valves *within* the persistent calyx-segments. 2. IVY-LEAVED BELL-FLOWER.

(COROLLA BELL-SHAPED, THE LOBES BROAD AND SHORT. ANTHERS UNCONNECTED.)

B. Stems erect or ascending. Upper leaves *narrow*, or at all events *pointed*. Capsule opening by valves *exterior* to the persistent calyx-segments, and situated near the base or at the side.

1. Upper stem-leaves linear or lanceolate, and entire or nearly so.

* Lobes of the corolla shorter than the undivided portion. Plant glabrous.

Stems 3—18 inches high, very slender and flexible. Flowers few, almost invariably pendulous or half-pendulous, in a light and terminal panicle, their stalks slim and tremulous; sometimes (in small plants) almost or quite solitary. Radical leaves numerous, roundish, angular, on long petioles, disappearing early in the season; stem-leaves gradually narrower upwards. Capsule opening by valves near the base. 4. HAIRBELL.

Stems 12—18 inches high, stiff and erect. Flowers few, very large, more than an inch wide, broadly expanded, light blue, in lax terminal clusters, almost always erect, and often solitary. Lower leaves obovate, tapering into petioles. Capsule opening by clefts near the top. 11. PEACH-LEAVED BELL-FLOWER.

** Lobes of the corolla reaching to the middle. Stem and leaves more or less hairy or roughish. Lower leaves obovate or oblong. Capsule opening by clefts near the top.

Stem 2—3 feet high, erect, and stiff. Flowers rather small, in long and compact racemes. Corolla swelling at the lower part. 6. RAMPION.

Stem 1—2 feet high, with slender and spreading branches. Flowers panicled, fine reddish-purple, the corolla rather large, narrow at the base, gradually dilating upwards, so as to be very open at the top. 10. SPREADING BELL-FLOWER.

2. Stem-leaves ovate-lanceolate or cordate, and decidedly serrate or crenate along the edges. Capsule opening by pores at the base.

* *Flowers deep violet-colour*, cylindrical, *sessile*, and collected into dense terminal clusters, with a few solitary ones sometimes in the upper axils. Stem stiff, erect, rough, angular, 12—24 inches high. Radical leaves stalked; upper ones amplexicaulent. Capsules erect. 9. CLUSTERED BELL-FLOWER.

** Flowers 2—3 together, forming loose, somewhat leafy, terminal clusters, which are sometimes almost capitate. Plant remarkably rough. *Lower leaves resembling those of the nettle*, petiolate, cordate at the base, and with large, unequal teeth. *Corolla hairy.* Capsules half-pendulous. 8. NETTLE-LEAVED BELL-FLOWER.

(COROLLA BELL-SHAPED, THE LOBES BROAD AND SHORT. ANTHERS UNCONNECTED. Stems erect. Upper leaves *narrow*. Stem-leaves ovate-lanceolate. Capsule opening by pores at the base.)

⁂ Flowers axillary and solitary, forming leafy and terminal racemes; capsules half-pendulous.

‖ *Leaves all narrowed at the base*, the lower ones often 6—8 inches long by 2 in width. Stem rounded, 2—5 feet high. *Flowers glabrous externally*, large, erect while in bloom, often very pale, the lower ones in the axils of leaves longer than themselves, the upper ones in the axils of shorter leaves.

5. GIANT BELL-FLOWER.

‖‖ Lower leaves cordate at the base. Plant 1—2 feet high.

Flowers in a long terminal raceme, unilateral, pale blue, always pendulous, and longer than the leaves or bracts to which they are axillary. Calyx reflexed.

7. CREEPING-ROOTED BELL-FLOWER.

Lower flowers in the axils of leaves longer than themselves. Corolla hairy and deep blue. Plant remarkably rough.

8. NETTLE-LEAVED BELL-FLOWER (casually).

HABITATS AND DISTRIBUTION.

1. JASIONE—*Jasi'one monta'na.*

Dry hedgebanks, and on green hills by the sea. Common in England and Ireland, but in Scotland rare. Fl. June—August. Annual and biennial.

Curtis, ii. 278; E. B. xiii. 882; Baxter, v. 373.

A pretty little plant, with so much the aspect of a *Scabio'sa*, that it is often called "Sheep's Scabious;" and so much resembling the Compositæ in its united anthers, that Linnæus classed it with them. The resemblance to the Californian *Gil'ia capita'ta* is equally striking.

2. IVY-LEAVED BELL-FLOWER—*Wahlenber'gia hedera'cea.*

Among the moss by the sides of little water-courses in woods and glens. Chiefly in the south and west of England. Plentiful in Devonshire and Cornwall, growing in company with the *Sibthor'pia* and the *Anagal'lis tenel'la.* Woods at Gresford, abundant. Fl. June—September.

Curtis, iii. 464; E. B. ii. 73 (both as *Campan'ula hedera'cea.*)

3. SPECULARIA—*Specula'ria hyb'rida.*

Dry cornfields, where the soil is chalky; widely scattered, but not a common plant. Fl. August. Annual.

E. B. vi. 375 (as *Campan'ula hyb'rida.*)

4. Hairbell—*Campan'ula heterophyl'la.*

Everywhere on dry hedgebanks and grassy heaths, along the margins of fields, and in hilly and sunny wildernesses, amid patches of gorse and heather, beginning to flower in July, and lingering till the very sunset of the autumn.

Curtis, ii. 238; E. B. xiii. 866; Baxter, i. 61 (all as *Campan'ula rotundifo'lia.*)

Ordinarily, the name of this familiar little plant is spelt "*hare*bell." But since it refers to the slenderness of the stems, it is properly "*hair*bell"—

E'en the light hair-bell raised its head
Elastic from her airy tread.

The true "harebell" is the sylvan hyacinth, as plainly appears from the botanists and poets of three centuries ago—

Thou shalt not lack
The flower that's like thy face, pale Primrose, nor
The azured Harebell, like thy veins.

Shakspere at least would not have confounded a spring with an autumnal flower; he was too good a naturalist for that. But the sylvan hyacinth is now more usually known as the "blue-bell," though the blue-bell of Scotland is unquestionably the Campanula. Considered as to its structure, the hairbell excellently exemplifies the true nature of epigynous flowers. On the outside of the ovary there are five prominent longitudinal ridges, continuous with the midribs of the free extremities of the five sepals, and plainly indicating that the latter are in a state of adhesion to it for half their length. The five free extremities are subulate, twice as long as the ovary, and spread horizontally while the plant is in flower.

5. Giant Bell-flower—*Campan'ula latifo'lia.*

Woods and hedgebanks, where the ground is moist and the vegetation plentiful, also on river-banks, under trees. Common in the north of England, the south and west of Scotland, and in Ireland. Near Manchester very abundant. Fl. July, August.

E. B. v. 302.

When growing in woods the stem is sometimes very much elongated, and bears, instead of a raceme, only a solitary blossom. Frequent as a garden plant.

6. Rampion—*Campan'ula Rapunc'ulus.*

Dry banks, and margins of dry fields; rare, and probably a descendant of cultivation, having formerly been much grown in kitchen-gardens. Fl. July, August. Biennial.

Curtis, iii. 462; E. B. iv. 283.

7. Creeping-rooted Bell-flower—*Campan'ula rapunculoi'des.*

Woods, banks, and fields; rare, and very doubtfully indigenous. In Ireland not hitherto observed. Fl. July, August.

E. B. xx. 1369.

8. NETTLE-LEAVED BELL-FLOWER—*Campan'ula Trache'lium.*

Woods, groves, waysides, and borders of lanes, among brushwood. Not uncommon in England; in Ireland and Scotland rare. In Warwickshire and Shropshire "very abundant." Fl. July, August.

Curtis, iii. 461; E.B. i. 12.

9. CLUSTERED BELL-FLOWER—*Campan'ula glomera'ta.*

Dry pastures and hedgebanks upon chalk and limestone; widely scattered, but rather rare, and in Ireland not hitherto noticed. Fl. May—August.

Curtis, iv. 593; E. B. ii. 90.

Extremely common in gardens. *Campan'ula specio'sa* (Bot. Mag. liii. 2649.) is a fine variety of this plant.

10. SPREADING BELL-FLOWER—*Campan'ula pat'ula.*

Dry pastures, especially upon their borders, and on dry hedgebanks; rare, and not found in the north, nor in Ireland. Common in Shropshire. Fl. July, August. Annual or biennial.

Curtis, iii. 463; E. B. i. 42.

11. PEACH-LEAVED BELL-FLOWER—*Campan'ula persicifo'lia.*

A continental species, cultivated in English gardens from time immemorial, with blue, white, and double flowers, and said to be wild in woods near Cullen in Scotland. Fl. June, July.

E. B. Supp. ii. 2773; Bot. Mag. xi. 397 (var. *max'ima*).

12. ROUND-HEADED PHYTEUMA—*Phyteu'ma orbicula're.*

Dry pastures and waysides upon chalk in the south-east of England. Common upon the Surrey downs. Fl. July, August.

Curtis, iii. 465; E. B. ii. 142; Baxter, iii. 205.

13. SPIKED PHYTEUMA—*Phyteu'ma spica'tum.*

Woods and thickets in the neighbourhood of Waldron, Sussex, the only British locality. Fl. July.

E. B. Supp. i. 2598; Bot. Mag. xlix. 2347.

This beautiful family is represented in gardens by many species of the typical genus, chief among which for popularity is the good old-fashioned Canterbury-bell or *Campan'ula Me'dium,* sometimes called "Steeple-bells." The calyx in this species is 10-lobed; five of the lobes are narrow and spreading, the other five are large, cordate, and reflexed over the ovary, so as to conceal it from view. In this species we also have an excellent and ready illustration of the extraordinary dilation of the base of the filaments noticeable in the Campanulaceæ. The summit of the ovary, interior to the corolla, is no less completely concealed by their five triangular and converging white plates, than the exterior portion is by the calyx. The anthers, as in the rest of the genus, are very long, and hang down as if exhausted. A white variety is almost as common as the blue, and a "hose-in-hose" variety is not rare. Next in favour is the peach-leaved bell-flower or *Campan'ula persicifo'lia*, especially the double blue variety; and along with it, especially in cottage and farm-house gardens, the cluster-flowered, or *glomera'ta*, both described above as British. For indoor ornament, the most esteemed is the splendid *Campan'ula pyramida'lis*. When trained fanwise, or over a globular cage, no plant makes a finer appearance in a hall or portico, the branches extending to the length of three or four feet, and being covered with blue flowers for many weeks in succession. *Campan'ula pu'mila* is everywhere valued for the dense green tufts, crowded with little white or blue and pendulous bells, which it forms when used for an edging or placed on a rockery. *C. alpi'na* (Bot. Mag. xxiv. 957.) is a delicious little Swiss species, resembling a Gentian. *Platyco'don grandiflo'rum*, (vii. 252.) *Adenoph'oras* of different species, exotic *Phyteu'mas* and *Wahlenber'gias*, the *Jasi'one peren'nis*, representatives of *Glossoco'mia*, *Codonop'sis*, &c., are more or less frequently met with, but for the most part only in large collections. *Trache'lium cœru'leum* is more like a valerian than a campanulaceous plant, having corymbs of minute and pale-blue flowers. *Michaux'ia campanuloi'des* and *M. lœviga'ta* (vii. 219; lix. 3128,) are remarkable in this family for their 8 or 10-parted corollas, and 8 or 10 stamens. From the reflexed position of the petals, and the prominence given to the style and its crown of stigmas, their very singular and beautiful blossoms present the appearance of a passion-flower. The filaments, dilated at the base, as usual in Campanulaceæ, form a kind of pedestal in the centre. The *lœviga'ta* grows to the height of ten feet, flowering in the open border, although a native of Persia, until cut down by the frost. *Canari'na Campan'ula* (xiii. 444.) is equally remarkable here on account of its hexamerous and hexandrous flowers. The blossoms are orange-coloured and appear very early in the spring. This plant requires the protection of the greenhouse, as is the case also with that very neat and pretty little bush, the *Roel'la cilia'ta* (xi. 378.) The flowers of this grow singly, and are over an inch in diameter. When newly expanded, the corolla shows five distinct zones of colour, after the manner of a Parisian bouquet. The inmost portion is white, with a yellowish tinge; then comes a ring of deep-blue, inclining to black, and looking as if glazed; the next circle is grayish-blue, and resembles satin; the next is nearly white, and the outermost is lilac or pale purple. For a campanulaceous plant the *Roel'la* is remarkably rigid and dry; the leaves are linear, half an inch long, very numerous, spreading, ciliated and acute, with little tufts of young ones in their axils. Of hardy ornamental annuals there are several, belonging chiefly to the genera *Prismatocar'pus* and *Specula'ria*, both with saucer-shaped corollas. The well-known little plant commonly called "Venus' Looking-glass" is the *Prismatocar'pus Spec'ulum*. It received its name from the shape of the corolla, the mirrors used by the ancients having always been circular, whence the astronomical symbol of Venus is ♀, or the figure of such a mirror, with its handle. The stems and branches of this plant are procumbent, and 6—15 inches long; the deep-violet coloured flowers are produced in threes, and show extreme sensitiveness to the light. The seeds, as in many other species of the family, are minute, but of the most beautiful glossiness.

CXV. THE STYLIDIUM FAMILY.—*Stylidia'ceæ.*

A little family belonging chiefly to the swamps of New Holland, and represented by several species grown in greenhouses on account principally of the very remarkable structure of their flowers, which differs from that of all others except Orchids. The plants are modest in appearance, with small and simple leaves, and small and inconspicuous though abundant blossoms, the corolla generally irregular. The peculiarity consists in the adhesion of the two stamens to the style, the filaments combining with it in such a way as to form a gynandrous column. This column hangs over one side of the corolla until it is touched, when it rises up, and shifts to the opposite side, hanging over in the same manner until touched again. The stigma lies in a cavity at the apex of the column, concealed by the anthers. *Stylid'ium fascicula'ris* has the lower leaves scattered, the upper ones crowded into a whorl of 20—30; the flowers are produced in a raceme like that of an overblown candytuft, and resemble those of a little Crucifer; the petals are white, with pink spots at the base. *Stylid'ium scan'dens* (Bot. Mag. lix. 3136.) has panicles of lilac-rose-coloured flowers, with serrated petals, and crowded whorls of linear leaves, the extremities of which are curled like the incipient tendrils of a garden-pea. Other pretty species are *Stylid'ium graminifo'lium,* (xliv. 1918.) *S. tenuifo'lium,* (xlviii. 2249.) *S. hirsu'tum,* (lix. 3194.) *S. cilia'tum,* (lxviii. 3883.) and *S. recur'vum* (lxviii. 3913.)

CXVI. THE LOBELIA FAMILY.—*Lobelia'cea.*

A family of elegant herbaceous and under-shrubby plants, resembling the Campanulas in habit, shape of leaves, milky sap, inflorescence, and the general structure of the flowers and fruit, but differing from them in their almost invariably united anthers, which form a tube round the style, and are hairy at the extremity, and in the irregularity, for the most part, of the corolla. The latter usually consists of a cylindrical tube, expanded at the upper part into five long and narrow divisions, the two upper ones smaller, and forming an upper lip, the three lower ones larger, and diverging, so as to form a three-cleft and pendulous lower lip. Here, moreover, the grains of pollen are oval, whereas in the Campanulas they are spherical, and the corollas are often of a fine bright red, a tint unknown among the bell-flowers. Some authors do not value these distinctions, and regard the family as a section of the Campanulaceæ.

As a rule, the Lobeliaceæ prefer countries within or upon the borders of the tropics. They number three or four hundred species, and are in every case to be suspected, if not positively dangerous, on account of the excessive acridity of their milky juice.

Two grow wild in Britain.

1. Plant growing submerged in clear and still water. Leaves chiefly radical, 1—2 inches long, forming dense tufts which compose a lawn-like herbage at the bottom; individually almost cylindrical, and formed of two parallel tubes. Flower-stalk simple, nearly naked, rising vertically 6—8 inches above the surface, and terminating in a long thin raceme of pale blue, alternate and drooping flowers of about half an inch in length. MOUNTAIN-LAKE LOBELIA.
2. Plant growing on land. Leaves obovate or oblong and chiefly radical. Stem erect, 12—18 inches high, simple or nearly so, and terminating in a long and thin raceme of erect blue flowers. ACRID PURPLE LOBELIA.

HABITATS AND DISTRIBUTION.

1. MOUNTAIN-LAKE LOBELIA—*Lobel'ia Dortman'ni.*

Margins of lakes where the water is somewhat shallow, and the bottom gravelly. Common in Scotland and Ireland; rather less so in the north of England, but extending down the west side of the island and into Wales. Llyn Dinas, Snowdon. Fl. July, August.

Curtis, iv. 594; E. B. ii. 140.

2. ACRID PURPLE LOBELIA—*Lobel'ia u'rens.*

A heath between Axminster and Honiton, Devonshire, is the only known British locality for this plant, though in the western parts of Europe not uncommon. The progress of cultivation appears likely soon to efface it, but the right onward furrow of a generous utility is better than the preservation of a thousand wild Lobelias. Fl. July—September.

E. B. xiv. 953; Baxter, i. 79.

Blue and red Lobelias, especially the former, are now universal garden ornaments. The red ones are generally known as "Cardinal-flowers," and include the scarlet Cardinal or *Lobel'ia cardina'lis*, the *Lobel'ia ful'gens*, *Lobel'ia splen'dens*, and two or three others. These plants bear their brilliant crimson-velvet flowers in erect spikes upon the summit of stems three or four feet high. The leaves are lanceolate, and 3—4 inches long. The blue-flowered species are dwarf, and inestimable for edgings, little pots on the shelves of greenhouses, suspended baskets, and rustic-work made of old tree-stumps for the decoration of lawns. In such places they produce abundance of slender, half-drooping, half-trailing branches, 6—18 inches long, and a succession for many weeks of azure, or white and azure corollas. *Clinto'nias* resemble them, but are annual. In greenhouses there are many more Lobelias; species also of *Tu'pa* (lii. 2550.) and *Isot'oma*, (lviii. 3075.) and more especially of the beautiful under-shrubby genus *Siphocam'pylos.*—

The flowers of the last-named are mostly red and orange-colour, as in the Brazilian *S. coccin'eus* and *glandulo'sus* (lxxi. 4178, lxxiii. 4331.) *Centropo'gon* or *Lobel'ia Surinamen'sis* (vii. 225.) is a very old hothouse favourite. *Pra'tia corymbo'sa* (liii. 2693.) from the Cape of Good Hope, is remarkable alike for its incised red petals, and deeply serrated leaves, though the latter character appears still more strongly in one of the true Lobelias, the *L. robus'ta* from Hayti (lix. 3138.) *Monop'sis conspic'ua*, formerly called *Lobel'ia spec'ulum*, (xxxvi. 1499.) is a charming little trailer with deep-violet and nearly regular flowers, borne singly upon long axillary peduncles.

CXVII. THE GOODENIA FAMILY.—*Goodenia'ceæ.*

Delicate herbaceous or under-shrubby plants, mostly belonging to Australia and the islands of the warm seas of the southern hemisphere. They might be taken, ordinarily, for members of the Lobeliaceæ, but the anthers are usually unconnected, besides which they have a peculiarity connected with the stigma, so obvious and remarkable as at once to distinguish them from all other plants in cultivation. The style terminates in a large cup, a portion of which is the stigmatic surface, and which, if a flower-bud be cut open, is found presenting the aspect of a little goblet. At this period, or previous to the expansion of the corolla, the pollen is conveyed into the cup from the anthers, and fertilization is effected; when the flower opens, the cup is found to have its edges drawn together, concealing the pollen within, and the stamens are retracted. *Leschenault'ias*, which illustrate this curious structure and economy remarkably well, are now met with in every well-filled greenhouse, especially the dull-scarlet *L. formo'sa*, the *L. splen'dens*, (lxxii. 4256.) and the blue *L. bilo'ba*, the tint of which is the nearest approach to a clear true blue found in any flower we are accustomed to see in English conservatories. The foliage of these is heath-like; the little linear and glabrous leaves appear destitute of veins, and the slender ovary looks like a peduncle. *Goode'nia grandiflo'ra* (xxiii. 890.) has cordate leaves and handsome yellow flowers. *Eu'thales* (xxviii. 1137.) also with beautiful golden-yellow flowers, purple in the centre; *Scæ'vola*, (viii. 287, lxxi. 4196.) *Vellei'a*, *Dampie'ra*, &c., are all deserving of cultivation, but seldom seen.

CXVIII. THE FUCHSIA FAMILY.—*Onagra'ceæ.*

Herbaceous and shrubby plants, natives chiefly of the temperate parts of the world, and especially of North America and Europe. They are for the most part gay and ornamental, but of little discovered use economically. Leaves simple, rarely divided, usually lanceolate or ovate, pointed and serrate. Flowers usually regular and tetramerous; stamens usually eight; ovary inferior and solitary, often resembling a peduncle; style usually long; stigma often four-lobed; pollen-grains triangular, and often hanging together by threads; fruit usually a two or four-celled capsule, sometimes berry-form; placenta central; seeds usually numerous and minute. There is a tendency in some genera of this family, such as the Fuchsia, to acquire petaloid sepals; individuals are also very prone to the production of pentamerous flowers; a few species, on the other hand, are destitute of petals. Few families exhibit more conspicuous and elegant stigmas. In many of the willow-herbs, the *Clark'ias* and *Œnothe'ras*, they are four in number, often very large, recurved when full-grown, like the volutes of an Ionic capital, and then resembling a tiny internal flower of four petals, much in the same way that the stigmas of the Iris simulate an additional and internal corolla. In evening-primroses the stigmas are often double and treble the number customary to a tetramerous flower; they are of a light yellowish-green colour, reminding us of the *Marchan'tia polymor'pha* when in perfection, and seem a palm-tree in miniature. In the Enchanters'-wort or *Circæ'a*, the sepals, petals, and stamens are reduced to two each; and in the pretty little annuals called *Lope'zia* there is only one perfect stamen, this genus completing the ring of tetramerous changes, 8, 4, 2, 1, which is more noticeable in the Onagraceæ than in any other family. It is seldom also that we meet with plainer examples of the inferior ovary, resulting, as before described, from the adhesion of the calyx to its exterior surface, whereby the flower is lifted, in effect, on to the summit. This is remarkably conspicuous in the fuchsia. The inflorescence of the Onagraceæ is for the most part either racemose or axillary; in the former case the clusters are erect. There are about 30 known genera, and upwards of 450 species.

Fifteen occur wild or as colonists in Great Britain. The species of *Epilo'bium* are, however, so prone to variation, and there seems to be so ready a tendency among them to hybridise, that although names are at present being multiplied, the number will probably be some day much reduced.

A.

COROLLA YELLOW, an inch or more across, and not opening till evening. Stems 1—3 feet high, nearly simple, stout, roughish, and somewhat hairy. Leaves alternate, ovate-lanceolate, slightly toothed. Flowers axillary and sessile, forming long and leafy terminal spikes. Sepals four, more or less combined after the corolla has opened. Petals four. Stamens eight. Ovary an inch long. Stigma 4-lobed. Seeds without hairy tufts. 11. EVENING-PRIMROSE.

B.

COROLLA CRIMSON, LILAC, OR PURPLISH, rarely WHITE. Stamens *eight*. Sepals and petals each *four*. Ovary 4-sided, 1—2 inches long, pliant, and resembling a peduncle. Capsule opening at the summit into four valves, which curve outwards, and discharge abundance of seeds with white and silky plumes.

1. *Corolla rather irregular.* Stem erect and cylindrical.

Flowers in terminal racemes of 6—18 inches in length, large, an inch or more across, and very showy. Stems 3—6 feet high, glabrous, reddish, and nearly simple. Leaves lanceolate, glabrous, *veiny* and slightly-toothed. Calyx coloured. Ovary hoary, purplish underneath. Stamens and style bent downwards. Pollen blue. Stigma 4-cleft. Root creeping.
3. ROSE-BAY WILLOW-HERB.

Leaves linear, *veinless* and quite entire. Stem 12—18 inches high, often decumbent or prostrate, Style not longer than the stamens.
4. ROSEMARY-LEAVED WILLOW-HERB.

2. *Corolla quite regular*, the petals of equal size. Stigma 4-*lobed*, the lobes recurved when the flower is full-blown. *Stamens erect.* Flowers in leafy terminal corymbose clusters.

a. Plant 3—5 feet high, usually growing in masses, the flowers crimson, showy, and abundant. Stems *much branched*, hairy, downy and glandular. Leaves ovate-lanceolate, serrated and stem-clasping. Corolla an inch or more across; the petals cleft and veiny. Ovary downy. Root creeping. 5. GREAT CRIMSON WILLOW-HERB.

b. Stem seldom more than 18—24 inches high, cylindrical and *nearly simple.* Flowers lilac or rose-coloured, pale and inconspicuous.

Leaves lanceolate, downy on both sides, and the serratures few; the middle ones sessile. Stem softly hoary. Flower-buds erect. Capsule glabrous or nearly so. Root not creeping.
6. SMALL DOWNY WILLOW-HERB.

Leaves ovate, acute, glabrous, sharply serrate, and with short petioles. Flower-buds drooping. Capsule pubescent.
7. SMALL BROAD-LEAVED WILLOW-HERB.

Leaves lanceolate, stalked and serrulate. Stem downy and bluntly angled. Flower-buds drooping.
9. LANCEOLATE WILLOW-HERB.

3. Corolla quite regular. *Stigma club-shaped and undivided.* Stamens erect. Flowers insignificant. Plant erect, 1—4 feet high.

a. Stem with two or four vertical angles or prominent ridges, formed by the decurrent petioles of the leaves.

Leaves ovate-lanceolate, serrulate, and with petioles. Stem with two blunt and two sharp angles.
8. PALE ROSE WILLOW-HERB.

Leaves lanceolate, sessile, finely serrate. Stem nearly glabrous, and 4-angled, the angles at unequal distances. Plant usually much branched. Flower-buds *erect.* Capsule pubescent. 10. SQUARE-STALKED WILLOW-HERB.

(COROLLA CRIMSON, LILAC, or PURPLISH, rarely WHITE, and quite regular. *Stigma club-shaped and undivided.* Stamens erect.)

b. Stem cylindrical, *i.e.* without vertical ridges. Flower-buds *drooping*.

* Plant not exceeding six inches in height. Stem decumbent; flowers few.

Leaves ovate, *pointed*, nearly sessile, very thin, glabrous, flaccid and semi-pellucid. Flowers large.
13. CHICKWEED WILLOW-HERB.

Leaves elliptical and *obtuse*. Flowers bright red, seldom more than one or two. Stem rarely more than 2—4 inches high. Capsules erect, often as long as the plant itself. 12. ALPINE WILLOW-HERB.

** Plant 1—2 feet high, the stem nearly glabrous. Leaves narrow-lanceolate, sessile, and nearly entire. Flower-buds numerous and drooping. Capsules downy.
11. COMMON MARSH WILLOW-HERB.

C.

COROLLA WHITE or PINKISH. Stamens *two*. Leaves opposite and petiolate.—Plant erect, slender and delicate. Flowers minute but conspicuous, scentless, in long, erect, terminal and lateral racemes; the pedicels spreading, and reflexed when the fruit is ripening. Sepals and petals each two; the sepals reflexed, and the petals cleft. Ovary small, ovoid, covered with minute hooked prickles. Capsule 2-celled, 1 or 2-seeded.

Stem 9—18 inches high, more or less branched, and pubescent. Leaves horizontal, ovate, acute, wavy and toothed, or sometimes entire. Sepals green and hairy. Corolla white. Stamens pink. Capsule 2-celled, with a seed in each cell, and *becoming ripe*.
1. COMMON ENCHANTERS'-WORT.

Stem 6—8 inches high. Leaves cordate, toothed, perfectly glabrous, very thin, shining and semi-translucent. Calyx glabrous; the sepals sometimes pink. One of the cells of the capsule almost always abortive, and the fruit seldom ripening.
2. ALPINE ENCHANTERS'-WORT.

D.

PETALS ABSENT. Calyx 4-cleft, greenish. Stamens four. Stems 6—8 inches long, branching, procumbent, and rooting. Leaves opposite, ovate, and petiolate. Flowers axillary, solitary, and sessile. 15. ISNARDIA.

HABITATS AND DISTRIBUTION.

1. COMMON ENCHANTERS'-WORT—*Circæ'a Lutetia'na.*

Shady woods, groves, and lanes, loving rocky banks under trees, and the banks of rivers, where sheltered from the sun; common everywhere in England and Ireland, but in Scotland rather rare. Fl. July. Aug.

Curtis, i. 148; E. B. xv. 1056; Baxter, i. 9.

2. ALPINE ENCHANTERS'-WORT—*Circæ'a alpi'na.*

Shady woods, and in stony and shaded places upon mountains, where somewhat damp. Abundant in Scotland, and not uncommon in the north of England. Found also in Ireland. Fl. July, August.

E. B. xv. 1057 (not good.)

"*Circæ'a interme'dia*" appears to be a name given sometimes to large specimens of the *alpi'na*, sometimes to small ones of the *Lutetia'na*. There is certainly no *species* deserving to be so called. Under all conditions, these plants are among the most elegant that our country produces. They are immediately distinguishable by their light and erect racemes of pinkish-white flowers, the peduncles horizontal while the plant is in bloom, subsequently bent downwards, and tipped with a roundish seed-pod, rough over its whole surface with hooked bristles.

3. ROSE-BAY WILLOW-HERB—*Epilo'bium angustifo'lium.*

Moist banks, margins of damp woods, and on the borders of sheltered ponds; widely diffused, but nowhere common, and in many localities probably of garden origin, being of very old and general cultivation. Fl. June—August.

Curtis, i. 96; E. B. xxviii. 1947; Baxter, i. 14.

Distinguished, by some, into two subspecies; when the capsule is long and erect, it is called *Epilo'bium macrocar'pum;* when not more than an inch in length, and spreading, it is *E. brachycar'pum.*

The former is the cultivated state of the plant. Flourishing under the drip of trees, and in the smokiest of street purlieus, it is inestimable for suburban gardens, and, spreading rapidly, is especially excellent for banks and the rear of rockeries. A white variety is sometimes to be met with.

4. ROSEMARY-LEAVED WILLOW-HERB—*Epilo'bium rosmarinifo'lium.*

Stony places on mountains. Glen Tilt, Scotland. Fl. August.

5. GREAT CRIMSON WILLOW-HERB—*Epilo'bium hirsu'tum.*

Borders of streams and ditches, loving rich vegetable and alluvial soil, such as composes the sloping banks of rivers and cuttings subject to inundation in time of floods; a frequent companion of the meadow-sweet. Very common everywhere, except in the northern parts of Scotland. Fl. July, August.

Curtis, i. 93; E. B. xii. 838.

As the heat of summer declines, the fine crimson flowers come out in crowds, and give great richness to the river-banks. They yield the smell of baked apples, whence, in the country, the plant is often called "apple-pie."

6. SMALL DOWNY WILLOW-HERB—*Epilo'bium parviflo'rum.*

Pondsides and ditch-banks; common, except in the north of Scotland. Fl. June, July.

Curtis, i. 94 (as *Epilo'bium villo'sum*); E. B. xii. 795.

7. SMALL BROAD-LEAVED WILLOW-HERB—*Epilo'bium monta'num.*

Sandy banks, woods, roofs of cottages; very common everywhere, and a frequent weed in gardens. Fl. June—August.

Curtis, i. 169; E. B. xvii. 1177.

8. PALE ROSE WILLOW-HERB—*Epilo'bium ro'seum.*

Ditch-banks, and wet and boggy places; generally distributed, but nowhere common. Fl. July.

E. B. x. 693.

9. LANCEOLATE WILLOW-HERB—*Epilo'bium lanceola'tum.*

Wet and swampy places; rare, and hitherto observed only in the south of England. Fl. July.

E. B. Supp. iv. 2935.

Probably identical with the preceding, and chiefly distinguished by the lobed stigma, the representation of which in E. B. is, however, much exaggerated.

10. SQUARE-STALKED WILLOW-HERB—*Epilo'bium tetrag'onum.*

Sides of ditches and ponds, and in other watery and marshy places; common, except in the north of Scotland. Fl. July.

Curtis, i. 95; E. B. xxviii. 1948.

The perennial small-flowered willow-herbs mostly produce a number of offsets towards autumn, which, springing from the base of the stem about to decay, endure throughout the winter, and supply the flower-stems of the following year. A form of the *tetrag'onum* in which these scions appear very early, and with shorter seed-pods, is by some called *Epilo'bium obscu'rum* and *E. virga'tum.*

11. COMMON MARSH WILLOW-HERB—*Epilo'bium palus'tre.*

Similar situations, but not quite so general. Fl. July.

E. B. v. 346.

The willow-herbs are immediately distinguished from all our other wild-flowers by their lanceolate and serrate leaves, four-petaled pink or lilac blossoms, borne in terminal and leafy clusters, which are corymbose at first, and the long and slender ovary. This part, at the first glance, seems a peduncle, and being coloured, pliant, and one or two inches in length, the simulation is very remarkable. When ripe, the capsule opens from the top downwards into four long and narrow valves, which curl outwards, and liberate numerous little white-plumed seeds, that hang about it for some time. These render all the smaller species much more conspicuous when in fruit than while in flower.

12. ALPINE WILLOW-HERB—*Epilo'bium alpi'num.*

Wet places, and beside little streams among the mountains of the Scotch Highlands; common. Fl. July.

Curtis, iv. 606; E. B. xxviii. 2001.

From this is distinguished by some botanists "*Epilo'bium anagallidifo'lium,*" concerning which plant see Babington's Manual.

13. CHICKWEED WILLOW-HERB—*Epilo'bium alsinifo'lium.*

Wet and swampy places, and along the sides of rivulets and springs among the mountains of the Scotch Highlands; abundant. Sparingly in similar habitats among the mountains of Wales and the Lake district. Fl. July.

E. B. xxviii. 2000.

Very similar in characters to the preceding, and perhaps only a variety.

14. EVENING-PRIMROSE—*Œnothe'ra bien'nis.*

A North American plant, long since brought to this country, universal in gardens, and now naturalised in many places. Abundant on the coast of Lancashire, between Liverpool and Southport. St. Brelade's Bay, Jersey. Fl. July—September. Biennial.

E. B. xxii. 1534; Baxter, iv. 257.

The stamens and pistil become fully developed, and execute their office, in considerable part at least, some hours before the flower expands. Towards evening we see the yellow petals bursting through the calyx, the sepals of which hold together permanently at the summit: while we watch, they unroll and spread out flat, the flowers opening one after another, as if it were the lighting up of a floral candelabrum. No plant is more valuable for suburban gardens, since it is indifferent to soil, unaffected by smoke, and springs up abundantly from self-sown seeds.

15. ISNARDIA—*Isnar'dia palus'tris.*

Ditches, bogs, and pools; extremely rare. "Hampshire and Sussex;" now extinct? Channel Islands. Fl. summer.

E. B. Supp. i. 2593; Baxter. vi. 442.

The charming fuchsia, with its pendants of crimson, purple, and white, like the descending fires of some splendid sky-rocket, is not only foremost in this beautiful family, in respect of figure and colour, but embodies, at the same time, all its best characteristics. It has been known in this country, in its oldest species, the *Fuchs'ia coccin'ea,* for above seventy years, having been introduced from Chili in 1788. There are now nearly twenty other species in cultivation, with innumerable varieties and hybrids, some of them luxuriantly double. The prettiest, after the old scarlet, is the hybrid *globo'sa;* and the most remarkable the *Fuchs'ia ful'gens,* from Mexico. *Fuchs'ia excortica'ta* from New Zealand, has no petals. *Fuchs'ia arbores'cens* (liii. 2620.) differs from the others in having its flowers in great trichotomous panicles which are perfectly *erect.* The lower leaves of this splendid plant are 7 inches long by 2 or 3 in width, and well merit for it the name of "laurel-leaved." Few plants are neater, however, than the little *Fuchs'ia microphyl'la,* the flowers of which are only half an inch long. Originally treated as a hothouse shrub, then tried in the greenhouse, then in the open air, the fuchsia has eventually proved hardy enough to bear the winter with little or no protection, and in genial situations near the sea, as in the Isle of Man, becomes a grand circular bush, many feet high, and loaded with crimson blossoms till the close of the year. Few flowers are more protean in the form and colour of the calyx and corolla, or so remarkable for an equal splendour of hue in these two portions; nor is it less worthy of note that when doubled by the art of the gardener, they still retain the stamens and pistil. Individual blossoms are very commonly pentamerous; others may be found, very commonly, in odd morphological conditions, the stamens becoming petaloid, or one or more of the lobes of the calyx changing into a *bonâ fide* green leaf. In the *Fuchs'ia cylindra'cea* the flowers are diœcious. The fruit in this genus is a large, oblong, purple, many-seeded berry, and ripens very abundantly. Opposite leaves prevail in it, but there is a strong tendency, which sometimes becomes normal, to produce whorls of three or even four. In propagating fuchsias by cuttings it is important to remember this, since a shoot is produced from every axil, and a twig with the leaves in threes or fours will always make a much more elegant plant than one in which the leaves are only in pairs.

The principal herbaceous genus of the family esteemed for ornamental purposes, is *Œnothe'ra*. A number of handsome species, all more or less like the semi-English *Œ. bien'nis*, are in cultivation, some with flowers several inches across, some with pinnatifid leaves, some trailing and evergreen, some with the flowers white, some lilac or purple. The yellow ones are mostly "evening-primroses," opening their fragrant blossoms only with the decline of the sun, and are magnificent about 8 or 9 p.m. *Œnothe'ra taraxacifo'lia*, so named from the general resemblance of its pinnatifid leaves to those of the dandelion, produces flowers as large as the palm of the hand. When they open in the evening, they are pure white; by the next day or so they acquire a light pinky tint, and by the time they wither, they have turned to a beautiful rose-colour. *Œnothe'ra macrocar'pa* is a fine old perennial species, the trailing stems of which die away every winter, but are renewed in the spring, and the yellow flowers of which are never less than 3—4 inches across. *Œnothe'ra ripa'ria* is evergreen, and, producing a great profusion of small bright-yellow blossoms, is admirable for an edging, or as a gay contrast, in large beds, to scarlet verbenas. For these purposes, however, it is necessary that the branches be pegged to the ground. The corolla-tube in this genus is frequently several inches long, resembling that of the crocus, and the stigmas are often so viscid as to capture little flies. There is a strong tendency in the flowers, as in those of the fuchsias, to become pentamerous, the petals increasing to five, and the stamens to ten. In the pollen of several species, and in that of some other genera of this family, as *Clark'ia* and *Eucharid'ium*, there have been observed no less than four distinct tunics; and in the vigorous young leaf-cells of the species of the family in general, may be noticed great abundance of raphides, which are by no means so general in plants as is commonly taught and supposed. The *Clark'ia pulchel'la* and *Clark'ia el'egans*, with their white varieties, are exceedingly graceful plants, especially the former; *Eucharid'ium concin'num* (lxiv. 3589.) resembles a little willow-herb with trifid petals and four stamens. The pink flowers of this last are prettily streaked with white, and the sepals of the calyx, as well as in the *Clark'ias* and the *Œnothe'ras*, part for their whole length only upon one side, or at all events hold together by their points, two and two, as if loth to let the petals escape from bondage. *Gau'ra parviflo'ra* (lxiii. 3506.) has dense spikes of insignificant red flowers. *Epilo'biums*, in a few species, additional to the above-named, especially the light and elegant *Epilo'bium Dodonæ'i;* the pretty little annual *Lope'zias* (viii. 254.) and yellow-flowered *Jussieu'as*, are met with more or less frequently.

CXIX. THE MARESTAIL FAMILY.—*Hippurida'ceæ.*

An unimportant family of about seventy aquatic and half-aquatic plants, with flowers resembling those of the *Onagra'ceæ* in general structure, but distinguished by their sessile stigmas and minute calyx. The blossoms are generally very small and insignificant, and in many cases deficient in some of the parts. The corolla is often absent, and the flowers are often unisexual by defect. External resemblance to the Onagraceæ they do not possess in the slightest degree, yet they are best considered, perhaps, as a low and depauperated condition of that family, and many authors do not hesitate to place them in it as a sub-order. Raphides, which are so abundant in the *Onagra'ceæ*, here do not occur, a circumstance that deserves consideration. The marestail or *Hippu'ris* presents the simplest known condition of a flower, having but a single stamen, and a single carpel, no petals, and a calyx of the smallest possible dimensions. The water-featherweeds are excellent plants for the aquarium.

Four species grow wild in Britain.

A. Flower-stems simple, erect, rising 12—15 inches out of the water. Leaves linear, entire, in crowded whorls over nearly the whole length of the stem, only the lowermost portion being leafless; those near the base 2—3 inches long, the upper ones gradually shorter, so that the plant tapers to a point. Flowers minute, sessile in the upper axils, consisting only of a minute calyx, a little ovary, on the crown of which is the solitary and sessile stigma, and a solitary stamen, conspicuous from its redness. Rootstock perennial. Flower-stems annual. 4. MARESTAIL.

B. Aquatics, living wholly submerged, except when the flowers are raised above the surface of the water. Stems often many feet long, slender, and much-branched. Leaves whorled, sessile, and finely-pectinated. Flowers unisexual and monœcious. Calyx in both sexes 4-lobed; petals four in the male flowers; in the females (if present) very minute. Stamens 8, 6, or 4. Ovary 4-celled. Male flowers mostly uppermost.

- * Flowers all in the axils of leaves or of leaflike bracteas pectinated like the leaves. 3. SMALL WATER-FEATHERWEED.
- ** Flowers in many-whorled, reddish-yellow spikes 3—5 inches in length, the bracts seldom as long as the flowers, and never extending beyond them.
    - Spikes erect both while young and when mature. Leaves usually four in a whorl. 1. COMMON WATER-FEATHERWEED.
    - Flowers as in the preceding, but the whorls often reduced to a single flower each, and the lower or female flowers with pectinate bracts underneath them. Spikes *pendulous* while young. Leaves mostly three in a whorl; sometimes in pairs. 2. SLENDER WATER-FEATHERWEED.

HABITATS AND DISTRIBUTION.

1. **Common Water-featherweed**—*Myriophyl'lum spica'tum.*

Ponds and other stagnant waters; common all over Britain. Fl. July, August.

E. B. ii. 83.

2. **Slender Water-Featherweed**—*Myriophyl'lum alterniflo'rum.*

Ponds and ditches; common. Fl. July.

E. B. Supp. iii. 2854 (with magnified dissections).

Probably not distinct from the preceding.

3. **Small Water-featherweed**—*Myriophyl'lum verticilla'tum.*

Like the others, in ponds, and quiet recesses of streams; common, though apparently not so general as its congeners, and in Scotland not found. Fl. July.

E. B. iv. 218; Baxter, v. 376.

The flowers are sometimes elevated in a rather tall spike, when the plant becomes "*Myriophyl'lum pectina'tum.*"

4. **Marestail**—*Hippu'ris vulga'ris.*

Watery ditches, shallow ponds, and clear though stagnant pools; rather rare, though widely distributed. Southport, Lancashire, abundant. Fl. June, July.

Curtis, ii. 218; E. B. xi. 763; Baxter, i. 49.

The configuration of this plant is very much that of a young leafy-stemmed *Equise'tum.* It is distinguished at once by the want of the bristly sheaths that surround the joints in all of the latter genus, and at midsummer by its whorls of minute red flowers.

CXX. THE MYRTLE FAMILY.—*Myrta'ceæ.*

The plants named after the myrtle constitute one of the noblest groups in nature. Few species are of less stature than itself, while in the warm countries to which they chiefly belong, many, such as the *Eucalyp'ti* of New Holland, become trees of vast height and the grandest beauty. Some of what are called the "Stringy-bark Gum-trees" are said to rise nearly to the height of the Monument before they branch, and the red and blue gum-trees almost equal them. In curious contrast to these giants, the little *Myr'tus nummula'ria* of the Falkland Islands "spreads over the soil as wild thyme does in Europe." A considerable diversity of aspect is of course in so large a family to be expected, but the common myrtle, in its evergreen and fragrant foliage, and hawthorn-like flowers, may still be taken as a fair representative.

In one way or another, no family is more decidedly marked. Simple, opposite, and entire leaves, destitute of stipules, thickly sprinkled with minute pellucid dots, like those of the orange-tree and certain Hypericums, and having a vein running parallel with the margin, are found almost universally, and in the few cases where the leaves are alternate, the marginal vein is still discoverable. If the dots be too minute for the naked eye, as happens in the *Eugé'nia myrtifo'lia*, they may be discovered with the aid of a magnifying-glass; and when the leaves, as sometimes happens, are needle-form, the stamens are united by their filaments into five long and elegant crimson sprays, such as we find in *Calotham'nus*, and which occur in no other order of plants. It may be observed here, as a general rule, that characters pertaining to particular genera of a family are frequently more valuable for practical purposes than the characters of the family to which those genera belong. Family-characters are often somewhat obscured, and if we trusted to them alone, we should sometimes be unable to find our way. In *Calotham'nus* for example, and the allied genera, the technical diagnosis of the Myrtaceæ has very slender expression, yet no plants are more easily identified if we make our first observations upon the stamens.

The flowers of this beautiful race are regular, often rosaceous in general figure, and in colour usually white or red; a few species are yellow, but not a single one is blue. The sepals are usually either four or five; the petals are of the same number, though occasionally absent; the stamens are numerous, (except in *Bæck'ia*, which has only eight) seated upon the calyx, frequently with long filaments, and occasionally combined into five fasciculi. The ovary is solitary, always of more than one cell, and, owing to the adhesion of the tube of the calyx to its outer surface, "inferior," or below the perianth; when ripe, the fruit is either capsular or berry-like. The first of these two forms is illustrated in the singular capsules of the *Eucalyp'tus* and *Leptosper'mum*, specimens of which, brought from New Holland, are common in museums. The other has examples in the guava, the berries of the myrtle, and the fruits of various species of *Euge'nia*. The pomegranate presents a very anomalous structure. This far-famed fruit is the only one of its kind, and consists of a coriaceous capsule divided into two unequal parts by a horizontal membrane; the lower portion is again divided into three cells, and the upper one into five or more, and into these cells are crammed innumerable semi-transparent bags of cold thin juice, every bag containing a solitary seed.

The especial qualities of the Myrtaceæ are of the class called aromatic, and are so eminent as to place them in the front rank. They are found in their maximum in allspice, which is the dried fruit of the *Pimen'ta vulga'ris*, (Bot. Mag. xxx. 1236.) a noble West Indian tree; and in cloves, which are the dried flower-buds of the *Caryophyl'lus aromat'icus* (liv. 2749.) The merits of the family as an ornamental one are, however, quite on a par with its economic value. The common myrtle, botanically *Myr'tus commu'nis*, has been a favourite from the remotest ages. Though now found wild on the shores of the Mediterranean, it came originally from Persia,—how anciently brought thence we may gather from the tradition preserved by Pliny, that the first myrtle that grew in Europe was planted by the tomb of one of the companions of Ulysses. England first possessed the myrtle in 1585, when it was brought from Spain by Sir Francis Carew and Sir Walter Raleigh. Ancient poetry and worship consecrated its sweet foliage to the goddess of love, who, when she rose out of the sea, came already crowned with a chaplet wrought of the leaves. In the Isle of Wight, Devonshire, Cornwall, near Beaumaris, and in other favourable parts of the country, this celebrated shrub grows out-of-doors, and often attains considerable stature. It occurs under two principal forms, the broad-leaved, and the little Tarentine or box-leaved, which blooms late in autumn. There is also a variety with the flowers double. Probably many others of the Myrtaceæ might be cultivated on our southern coasts with equal success, especially those fine Australian species which in their native country become trees, such as the different kinds of *Eucalyp'tus*. In winter-gardens these latter are inestimable, along with the splendid plants belonging to the genera *Metroside'ros*, (xlii. 1761; xliii. 1821.) *Melaleu'ca*, (xliv. 1868.) *Calotham'nus*, (xxxvii. 1506.) and *Beaufor'tia*, (xlii. 1733) many of which are well-known in greenhouses under the name of "bottle-brush trees," given them on account of the miniature resemblance to a bottle-brush presented by their dense and cylindrical clusters of crimson flowers, which are generally surmounted by a tuft of leaves. These last are excellent examples of the Linnæan class Polyadelphia. The species of *Eucalyp'tus*, (xlvi. 2087; lx. 3260; lxxviii. 4637.) also of *Leptosper'mum*, (xliii. 1810; liii. 2695; lxii. 3419.) *Euge'nia*, (xxxi. 1241.) and their immediate allies, have flowers more of the figure and disposition of the common myrtle, though the stamens are sometimes so overwhelming as to remind us of the globular heads of *Mimo'sas*. In *Eucalyp'tus* the leaves are nearly circular, and in texture leathery. *Euge'nias* often bear fruit, especially that one popularly called the "fruiting-myrtle," (*Euge'nia Ugni* of lxxviii. 4626.) the produce of which is delightfully fragrant. A species of guava

(Psid'ium Cattleya'num) also ripens its fruit occasionally; but the pomegranate does no more than put forth its crimson blossoms. This famous tree, botanically *Pu'nica grana'tum,* (xliii. 1832.) is like the myrtle, a native of Persia, where whole forests are exclusively composed of it. For ages it has been extensively cultivated in the south of Europe, whence are imported the half-ripe capsules so common in the shops at Christmas. Unripe as they are, they still show in their delicate colour and nippled roundness, how apposite are the metaphors of Eastern poets when they cite the pomegranate in connection with female beauty.—The place given to the apple in the love-poetry of ancient Greece probably belongs to the same fruit, since in bygone-times the name of apple was given to all of this general figure.* *Trista'nias* (xxvi. 1058.) are pretty little shrubs with lanceolate leaves, and axillary and trichotomous clusters of yellow flowers; *Babingto'nia camphoros'mæ* (Bot. Reg. N. S. v. 10.) is a very curious and interesting shrub from the Swan River. The white hawthorn-like flowers are produced in a long spike resembling that of the agrimony; the abundant leaves are small and linear. The interesting feature of the plant consists however in the structure of the fruit, the placenta not being derived, as usual, from the carpellary leaves, but standing independent of them, and the style being protruded through an opening in the apex of the ovary. *Bæck'ia* and one or two other genera present a structure very similar.

CXXI. THE MELASTOMA FAMILY.—*Melastoma'ceæ.*

A splendid and extensive family, almost confined to the tropics, scarcely any species being found in temperate latitudes, and none at all in Europe. Many are great favourites for hothouse cultivation, either for the beauty of their flowers, or the extreme richness of their foliage. In habit they are under-shrubby, with a disposition sometimes to weakness, and when tall, to rest upon other plants for support. The leaves are opposite, simple and undivided, generally ovate or elliptical and pointed, and in almost every case provided with several strong and conspicuous ribs that flow in elegant curves from the base to the apex. They are also frequently traversed by lateral veins in such a way as to present a multitude of delicate rectangles that gradually decrease in area towards the margin. *Cyanophyl'lum magnif'icum,* now common in conservatories, exhibits these peculiarities in perfection. Every leaf of this superb plant is two or three feet long, by

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* See, for illustrations, "Life, its Nature, Varieties, and Phenomena," chap. xxiv. Ed. 2.

12—18 inches in width at the broadest part; the under-surface is purple, the upper one rich green; and as every successive pair of leaves exactly crosses the pair next below it, and at a well-proportioned vertical distance, the whole spreading horizontally, with a slight inclination downwards, the effect is in the highest degree imposing. Unfortunately it grows so fast, and takes up so much room, that in hothouses where space is precious, it is almost an incumbrance.—*Sphærog'yne latifo'lia* is in some respects superior to the *Cyanophyl'lum*, having a delicate velvety bloom upon the surface of the leaves, and branching laterally. The stem and leaf-stalks of the latter are red, and thickly covered with reversed hairs, by which it may at once be known from the *Cyanophyl'lum*.

In their flowers the Melastomaceæ differ from all other plants. The parts, excepting the ovary, which is always solitary, vary in number rather widely, some genera being tripetalous and triandrous, while in others there are 4, 5, 6, or 8 petals, and 5, 8, 10, or numerous stamens. But whatever the number of parts, they correspond universally in having their long anthers bent down parallel with the filaments prior to the expansion of the corolla, and lodged in cavities between the ovary and the tube of the calyx. This very singular position seems at variance with the fact of the flowers being *epigynous*. But on dissection it is found that the ovary is lobed, and provided with vertical ridges, to which latter only the calyx adheres, leaving the intermediate spaces to be occupied in the manner described. Hence these plants become eminently instructive in regard to the true idea of the epigynous structure. Frequently also the stamens are provided with long appendages that often make them resemble a bundle of little yellow scimitars. These are strikingly conspicuous in the flowers of the typical genus *Melasto'ma*, (li. 2441.) also in *Chætogas'tra*, (lxiii. 3481.) *Osbeck'ia*, (lxvi. 3790.) *Heterocen'tron*, and the *Monochæ'tum ensif'erum*, the name of which acknowledges the odd similitude. It happens not infrequently that three entirely different colours are presented by the filament, the sword-like appendage, and the anther, which last is always linear and golden-yellow.

In general, the lovely flowers of this family are regular, and in colour purple, red, or lilac; they are often an inch or two across, occasionally solitary, sometimes in little panicles. In the *Medinil'la magnif'ica* they form a grand rose-coloured chandelier 12—20 inches in depth, and nearly as wide at the base. One of the prettiest of the race, and the smallest, is the well-known *Soneril'a margarita'cea*. The abundant, dark-green and glossy leaves are borne on very slender branches, and copiously sprinkled with white spots resembling seed-pearl; the rosy flowers grow in little clusters, and have three stamens and three petals, two of which are nearly horizontal, while the third meets them at a right angle. *Centrade'nias* are valued for the profusion of their little elliptical and reddish-green leaves, which form an admirable foil for light colours in winter bouquets. *Arthrostem'ma*, (lxv. 3678.) *Lasian'dra*, (lxvi. 3766.) *Bla'kea*, (xiii. 451.) *Mico'nia*, a genus mostly with white flowers, *Merian'ia*, *Charian'thus*, *Plero'ma*, (lxix. 4007,) and *Oxyspo'ra*, (lxxvi. 4553.) are in every case splendid ornaments. *Plero'ma el'egans* is an especially valuable plant, being loaded with its grand violet-purple flowers in late summer and autumn, a season when so few hothouse plants are ordinarily in bloom. The foliage, as in most of the others, is evergreen; the calyx will come quite away from the ovary, if gently stripped towards the base; the capsule is bristly, 5-celled, and many-seeded. Among the ornamental-foliage species, besides the above-named, *Phyllag'athis rotundifo'lia* is esteemed for its elegant deep-green and full-ribbed leaves, and *Eriocne'ma marmora'tum* for their beautifully-marbled surface. *Rhex'ia Virgin'ica*, (xxv. 968.) a native of the swamps of Virginia, Maryland, and Carolina, is hardy enough to blossom out of doors.

CXXII. THE COMBRETUM FAMILY.—*Combreta'ceæ.*

A family of about 200 trees and shrubs, natives of tropical Asia, Africa, and America. They are interesting as the source of the "myrabolams" used by dyers, which are the plum-like fruit of different species of *Termina'lia;* and as including that splendid climbing shrub of the hothouse, the *Combre'tum purpu'reum*, sometimes called in books *Poivre'a purpu'rea.* (Bot. Mag. xlvi. 2102.) The flowers of this plant are of the most vivid and brilliant crimson, individually the size of hawthorn-bloom, pentamerous, with ten stamens, and borne in racemes 3—8 inches in length, the long filaments as conspicuous as the corollas. The leaves are oval, entire, and exstipulate. *Quisqua'lis In'dica* (xlvi. 2023.) is also a fine climbing-plant, producing its remarkably long-tubed flowers in terminal corymbs. When they expand in the morning they are nearly white, in the course of a few hours they become pink, and the following day they are deep-red. The general characters of the family indicate affinities with the Myrtaceæ, but the leaves are destitute of translucent dots, and the ovary is never more than one-celled. Besides this, the flowers are frequently apetalous, and very often collected into heads. The Jamaica Button-tree or *Conocar'pus erec'ta*, an arborescent species with small heads of yellow flowers; *Termina'lias* of three or four kinds; the *Geto'nia floribun'da*, and the *Buci'da Bu'ceras*, a tree with racemes of yellowish-white flowers, are found sometimes in large collections, but they have no merits that will ever give them popularity.

CXXIII. THE GENETYLLIS FAMILY.—*Chamælaucia'ceæ.*

The plants of this family are beautiful little evergreen bushes, natives of New Holland, and abounding in every part with minute reservoirs of aromatic oily matter. In their flowers they bear some resemblance to certain myrtaceous genera, but the physiognomy is quite different, and as in the Combretaceæ, the ovary is only one-celled. Two or three of the species are not uncommon in good collections, and never fail to attract the curious. The best of them is the *Genetyl'lis* or *Hedaro'ma tulipif'era.* The leaves of this resemble those of the *Saxif'raga lingula'ta*, but are barely an inch long; and when looked at as opaque objects, show the dots very plainly. Near the summits of the stems and branches there are numerous cream-coloured bells, blotched with red, about an inch in length, and not very unlike the flowers of the snake's-head-lily, only smaller. The bells are solitary, and although sessile, half-pendulous, and consist of seven or eight bracts of different sizes, inside of which there are about 12 little starlike blossoms. The corollas of these are white and hard, and 5—6-cleft, with 10—12 sessile anthers forming a ring just inside, and a long white style that reaches nearly to the mouth of the bell; the ovary is inferior and green. *Caly'thrix virga'ta* (Bot. Mag. lxi. 3323.) is equally pretty, though in a very different way, and is immediately distinguished by the attenuated sepals of its little red flowers, which extend into bristles an inch in length. *Darwin'ia fascicula'ta* is decumbent, and has styles three times as long as its small and clustered flowers. *Verticor'dias* have the five lobes of the calyx multifid, and the flowers in dense corymbs.

CXXIV. THE TUPELO FAMILY.—*Alangia'ceæ.*

A little family of trees belonging partly to the East Indies, partly to North America, and, like the preceding, structurally related to the myrtaceous plants. The Tupelos of Carolina and the neighbouring states are almost the only species found in collections, and even these are extremely rare. The common Tupelo, or *Nys'sa biflo'ra*, attains in England the height of 30—50 feet. The leaves are alternate, ovate-oblong, entire, acute at both extremities, and glabrous. They are often united in bunches at the ends of the young lateral shoots, and die off in the autumn of a deep scarlet colour. The flowers are pentamerous, apetalous, very insignificant, and produced in little axillary corymbs in April and May. Some of the trees are monoclinous, others only male, and as none but examples of the latter occur in England, the obovate and deep-purple drupaceous fruit produced in America, is here never seen.

CXXV. THE CACTUS FAMILY.—*Cacta'ceæ.*

The Cactus family is composed of several hundred species of tropical succulents, almost always unprovided with leaves, and of the most diversified and frequently grotesque configuration. Some consist only of angular and thorny stems, varying in diameter from that of a finger to a man's arm, and which often rise to the height of many feet, and sometimes attain an altitude of several yards. The flowers of these are produced chiefly at the upper part, and being in most cases large and showy, the plants have received the appropriate name of Torch-thistles. The stems of others are slender, trailing, and snake-like, as in the well-known "Creeping Cereus," (Bot. Mag. i. 17.) which, when placed in a suitable position, hangs down long prickly tails to the depth of two or three feet. In this one the crimson flowers are produced near the base of the plant, and generally in great plenty. Other species consist of a number of oval or obovate green lumps, 2—12 inches long, vertically flattened, very fleshy in their substance, and attenuated at the base, the upper ones sprouting in a proliferous manner out of the tops or edges of those below, like the branches of the *Coralli'na officina'lis.* These, called "Joint-cactuses," are well illustrated in the *Epiphyl'lum trunca'tum*, (lii. 2562.) a very common species, the articulations of which resemble those of the lateral claws of a crab or lobster. The flowers of this singular plant are about two inches long, irregular, crimson or rose-coloured, horizontal, with the upper petals reflexed, and the stamens curved upwards. When the leaf-like expansions are of considerable length, say 6—18 inches, erect, comparatively thin, scarcely branched, and with deep indentations along the edges, from which the large and very brilliant flowers are produced, and with a strong midrib prominent on each side, the plants are called "Leaf-cactuses." They belong, with the preceding, to the genus *Epiphyl'lum*, and have many familiar examples, such as the *Epiphyl'lum specio'sum* or *phyllanthoi'des*, (xlvi. 2092.) a beautiful plant with abundance of stems and rosy flowers, the latter two inches across, but not much opened. Some of the jointed species are very copiously branched, rising also to a considerable height, and have the surface studded with tufts of thorns. When this is the case, they are *Opun'tias*, popularly "prickly-pears" or "Indian-figs," the English names referring to the edible fruit of the *Opun'tia vulga'ris* (l. 2393.) "Melon-thistles" resemble the fruit after which they are named. They are spherical, green, fleshy, with broad and deep vertical furrows, and corresponding ridges, which extend from the base to the summit, like the meridians of a globe. Along the ridges are clusters of strong sharp spines, of a pale-brown or ashy-green colour; the blossoms are produced upon an odd kind of flowering-head, the latter covered with short and woolly brown bristles. These are, botanically, species of *Melocac'tus*, and occur very commonly in collections of curiosities. The "hedgehog cactuses," or *Echi'nocacti*, are also ovoid or globular, or sometimes of the figure of a depressed cone, but destitute of a flowering-head, and defended by a more formidable *chevaux-de-frise* than is found upon any of the others. "Teat-cactuses," constituting the genus *Mammilla'ria*, are ovoid or shortly columnar, and covered with conical green mounds, every one of which is tipped with a woolly tuft that in the centre has a fascicle of spines. The flowers are put forth from between the mounds, indifferently upon all sides, or in some cases in such a way as to form a coronet. They are often very handsome. The spines of the contiguous mounds generally meet and overlap, and in the pretty little *Mammilla'ria ten'uis* (lxv.3646.) the smallest of its race, and only 2—4 inches high, they are so numerous and close as to resemble cobweb. These latter kinds propagate spontaneously by globular offsets, thrown out principally at the base of the parent cone. In the genus *Rhip'salis*, the plant consists either of a number of long and slender green branches, the thickness of a white clay pipe, whorled where they ramify, and with obtuse extremities; or else of a number of little joints arranged in the manner of the *Salicor'nia*;—and lastly, in the *Peres'kias*, we have plants that would scarcely be supposed at first sight to be cactaceous, the stem being provided with large, glossy, and elliptical leaves, and the handsome flowers, which have reflexed petals, growing in axillary clusters. *Peres'kia Ble'o* (lxiii. 3478.) is in foliage not unlike a periwinkle.

The flowers of these wonderful plants are often of great size, though sometimes, as in most *Rhipsal'ides*, insignificant. Red and yellow are the prevailing colours, white being rare, and blue unknown. Generally they last only for a day or night, the nocturnal ones, such as the celebrated "night-blowing cereus" (lxii.3381.) not opening until 10 p.m. They are usually solitary and sessile, in composition regular, and formed of numerous lanceolate sepals and petals of satiny lustre, the sepals generally coloured like the petals, and the innermost of the former indistinguishable from the outermost part of the corolla, so that it often appears as if the flower were destitute of calyx, and as if the corolla gradually diminished outwards and downwards into bracts. The ovary is below the flower, and might be taken for a succulent peduncle, but on cutting into the lower part of it, the mass of white ovules is readily found. The stamens are usually very numerous, epipetalous, and often with filaments so long and slender as to resemble a tassel of white silk; the long style with its beautiful multifid stigma then lies half-concealed among them. When ripe, the ovary becomes a succulent and many-seeded berry, which is often large and pleasant to eat, as in the *Opun'tia.* That of the *Rhip'salis* closely resembles the pearl of the mistletoe, but is distinguished immediately by its abundant little black seeds. In the crab-jointed *Epiphyl'lum trunca'tum* the regularity of the flowers is lost; in *Peres'kia* there are only ten petals, and in *Rhip'salis* only five.

America is the exclusive habitation of the Cactaceæ in the wild state, the greater portion occurring in the tropical parts. There they attain dimensions almost incredible; even in Chili Mr. Darwin found one six feet in circumference, and many that were 3—5 yards high. The age they attain is also very considerable, the life of the larger forms probably enduring even for centuries. In England, like the aloe, they outlast the great majority of plants, and seem a kind of vegetable sculptures. With the exception of the Opuntia, (which in warm places in the south, and in the Channel Islands, thrives out of doors) in Britain they all require the greenhouse, though many species are indifferent to cold, provided they be kept dry. A great number are in cultivation, including, besides those above-mentioned, the incomparable *Cac'tus speciosis'simus,* the great crimson flowers of which are flushed internally with violet; and the cochineal-cactus or *Opun'tia cochinel'lifer,* (liv. 2741.) a native of Barbadoes. The calyx in this one is green, the petals are bright rose-colour, and the fruit is concave at the summit.

CXXVI. THE COFFEE-TREE FAMILY.—*Cinchona'ceæ.*

The family which receives its English name from the inestimable Coffee-tree, is one of the largest with which botanists are acquainted, and contains several of the most useful plants in the world. Some of the most important of known medicines are yielded by it, as quinine and ipecacuanha; there are species also that give agreeable fruits and valuable dyes. Like all other extensive families, it includes plants of great variety of figure and stature, but in essential characters it is well-marked and strictly limited. The leaves are simple and undivided, for the most part ovate-lanceolate and pointed, petiolate, quite entire, and opposite, or occasionally in whorls of three, with two small and usually narrow and erect stipules between every pair, one placed upon each side of the stem, and midway between the petioles; the calyx is adherent for nearly its whole length to the solitary ovary; the corolla is regular, formed of four or five petals, which are frequently very long, and usually coherent for nearly their whole length, so as to form a narrow and slender tube, with a 4 or 5-cleft limb; the stamens are usually four or five, and epipetalous; the anthers are free and straight, and open longitudinally; the fruit is usually 2-celled, with a solitary seed in each cell, though in many genera polyspermous; the albumen is abundant and horny, and the embryo small.

The species, which are estimated at 2,500, belong almost exclusively to the hotter parts of the world, and, with scarcely an exception, are only known in conservatories. The fragrance and the beauty of the flowers are in many cases unsurpassed, but their rarity and costliness prevent their often coming before the public, except in the very choicest bouquets prepared for ladies. The colours are of the greatest variety and richness, scarlet and white predominating; the inflorescence is most usually corymbose, sometimes capitate, and in a few cases solitary. Now and then we find species eminently ornamental in their foliage, and which are esteemed for their leaves rather than for their blossoms. In cold and temperate countries the family is represented by the little woodruff and its allies, which latter plants some authors associate with it, calling the whole by the collective name of *Rubia'ceæ*. But although intimately related, it is better for practical purposes that they should be kept apart, the arborescent and tropical forms being distinguished as the *Cinchona'ceæ;* and the herbaceous and northern ones as the *Galia'ceæ* or *Stella'tæ.*

Foremost in this splendid tribe naturally stands the Coffee-tree or *Coffe'a Arab'ica.* (Bot. Mag. xxxii. 1303.) In English greenhouses it grows erect, and with somewhat of a conical form, to the height of several feet. The leaves are oblong-ovate, pointed, light-green and shining; the flowers are white, produced in little axillary clusters, in form not unlike jessamine, and fragrant, especially after sunset, and in due time are succeeded by green berries, which as they ripen turn red, and eventually black. The latter are about the size of a small damascene, and contain, when perfect, a couple of plano-convex seeds, with the flat sides face to face. Young plants spring up abundantly where they fall. The trees which yield Peruvian-bark, the source of quinine, are species of *Cincho'na*, a genus named by Linnæus in compliment to the Countess of Chinchon. The *Cincho'na officina'lis* has been recently introduced to this country, and is figured in Bot. Mag. lxxxix. 5364. A full account both of this and of the other important species may be read in Markham's Travels in Peru. *Quina*, that author tells us, signifies bark, and *quinquina*, corrupted into *china*, a bark possessing medicinal properties. *Exostem'ma* is a genus nearly allied to *Cincho'na*, and contains species of similar properties, as in *Exostem'ma longiflo'rum* (lxxi. 4186.) Ipecacuanha is extracted chiefly from the roots of the *Cephaëlis*, (lxx. 4063.) a small plant with terminal and solitary heads of flowers, the colour of which is reddish-white. Turning to the ornamental plants of the family, there is nothing in nature more graceful and sweet than the *Lucu'lia*. This exquisite plant is a native of Nepal and Sylhet, where it attains the size of a lilac-tree, though in England only a shrub. The flowers grow in large broad corymbs, something after the manner of a Phlox, but inexpressibly more beautiful, and resemble the Phlox also in the general figure of the corolla, which is the loveliest conceivable lilac-pink, and exhales an odour well described as *gratis'sima*. Among the choicest, after the *Lucu'lia*, and at the same time the commonest, are the superb *Ixo'ras*. These now display with pride, in every hothouse, vermilion, scarlet, or white corymbs as broad as the hand. The flowers are tetramerous, about half an inch across, and the four anthers lie flat and elegantly at the mouth of the tube. The incomparably odorous *Garde'nia*, single and double, the latter looking like a dishevelled white Camellia, (but not so large, and without its icy coldness,) is by many better known as the "Cape-jasmine." The species, of which there are several, come chiefly, however, from China, the East Indies, and Sierra Leone. *Mussæn'das* are known by the very curious and beautiful white wing associated with their copious clusters of little star-shaped yellow blossoms. This wing is one of the five sepals of the calyx, enormously enlarged, and looking like an ornamental bract. *Mussæn'da pubes'cens* from China (xlvi. 2099.) is the oldest in cultivation; *Mussæn'da macrophyl'la* is the handsomest. *Pen'tas car'nea* from Sierra Leone (lxx. 4086.) has corymbs of lilac and star-shaped flowers. *Bouvar'dias* have corymbs of long and tubular vermilion blossoms, as in the old and favourite *B. triphyl'la*, the *B. splen'dens*, (lxvi. 3781.)

and the *longiflo'ra* (lxxii. 4223.) *Rondele'tia odora'ta* is flesh-coloured, with an orange throat, the flowers again disposed in broad corymbs. *Faramé'a* (or *Tetrame'rium) odoratis'sima*, from the West Indies, is white and jessamine-like. *Cru'sea ru'bra* (xxxviii. 1558.) might be taken for one of the Pimeleas of New Holland. *Nau'cleas* are noble plants from the East Indies, with orange, yellow, or purple flowers in large round heads. *Hamilto'nias*, from the same country, are white or pale blue, and delightfully fragrant. *Portlan'dias* are remarkable for the great size as well as length of their tubular flowers, as in *P. grandiflo'ra*, (viii. 286.) a species by no means rare, and in the newer *P. platan'tha* (lxxvi. 4534.) *Couta'rea specio'sa*, from Demerara, is a most beautiful but very rare plant with purple, erect, and tubular flowers and six stamens. *Rogie'ras*, as *R. versic'olor*, (lxxvii. 4579.) are pretty shrubs, nearly allied to *Rondele'tia*. *Hame'lia chrysan'tha* and *ventrico'sa* (xliv. 1894.) have showy yellow or orange flowers; *Hinds'ias* are magnificent Brazilian plants with blue or violet flowers, as in *Hinds'ia longiflo'ra* and *viola'cea* lxix. 3977; lxxi. 4135.) *Cates'bæa spino'sa* (iv. 131.) has clusters of half-pendulous yellow flowers, six inches long, and in shape resembling a Roman trumpet. *Posoque'ria longiflo'ra*, from Guiana, has a white tube to its corolla of such length and slenderness that from the calyx to the extremity is at least a foot. *Manet'tia*, *Cu'pia*, *Chiococ'ca*, with brilliant white berries, *Oldenlan'dia*, *Spermadic'tyon*, and many more, are also cultivated, though not always with the merit of those named previously.

The species esteemed for their foliage are chiefly comprised in the genera *Campylobo'trys*, *Psycho'tria*, and *Pavet'ta*. The hardy ones are the pretty little rockery plants called *Housto'nias*, with white, blue, or scarlet flowers (xi. 370; lv. 2822; lviii. 3099.) A few species, it should be added, are insignificant weeds, such as the plants called *Richardso'nia* and *Spermaco'ce*, though now and then with neat flowers, as in *Spermaco'ce strigo'sa* (xxxviii. 1558.)

CXXVII. THE WOODRUFF FAMILY.—*Galia'ceæ* or *Stella'tæ*.

These plants are called "Stellatæ" on account of their little narrow leaves being disposed in whorls of 4—8, and presenting a succession of green stars, one to every node, from the base of the stem upwards. They are all herbaceous; the stems are weak, slender, and angular, erect and independent when not more than 4—12 inches high, but when exceeding that measure, and sometimes even when within it, either prostrate on the ground, or dependent upon stouter plants for support; the flowers, which are always minute, usually form large and showy panicles, though sometimes only small axillary or terminal corymbs; the branches of the panicles, like those of the stem, are always *opposite*. Calyx and corolla regular, usually 4-lobed, occasionally 3 or 5-lobed, the former sometimes extremely minute. Stamens the same number as the petals. Ovary inferior and 2-celled; style solitary, but cleft at the summit, and with a capitate stigma to each branch. Fruit consisting of two small globular carpels, which are usually dry, often rough or bristly, and contain each a solitary seed.

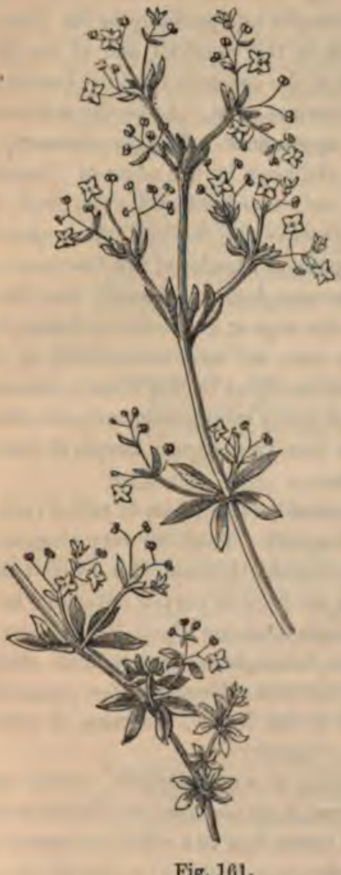

Fig. 161.
Smooth Heath Galium.

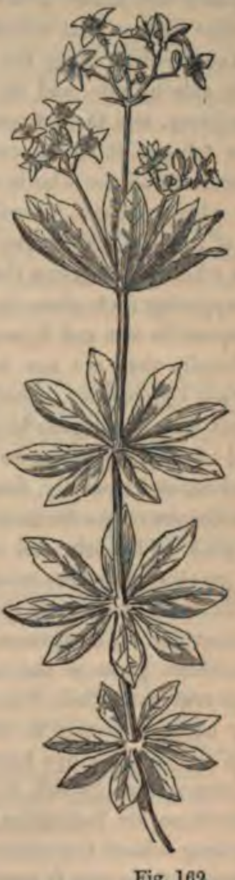

Fig. 162.
Woodruff.

On comparing the *Stella'tæ* with the *Cinchona'ceæ* it becomes evident however, as stated on p. 502, that much as they may be opposed in general aspect, the two families are most intimately allied, and that the plants now before us must be regarded as a humble expression of the same idea as that which is wrought out perfectly in the *Lucu'lia* and the *Ixo'ra*. Place the flowers of the woodruff and of the *Bouvar'dia* side by side, and the fruits of the common Cleavers beside the coffee-berry, and the connection is seen at once. As for the unlikeness of the foliage, it exists only in appearance. Though necessary in practice, to call the whorls of the Galiaceæ by the name of "leaves," these whorls consist in reality of only two genuine leaves, (from the axils of some of which arise the branches and flowers), the remainder of the whorl representing the interpetiolar stipules of the *Cinchona'ceæ*, and supplying their place in an excessive degree. Usually these latter correspond in size and figure with the true or gemmiferous leaves, but occasionally they are not half the size, as well exemplified in the *Asper'ula Cynanch'ica*. Some botanists object to this theory, contending that were the organs in question really interpetiolar stipules, there should never be either more or less than two to every couple of leaves, instead of, as frequently, five or six.

The flowers of the Stellatæ are generally clear white or yellow, sometime pink or blueish, and often fragrant. They are very elegant in form, presenting perfect crosses, as in many Galiums, or a 5-rayed star, as in the wild madder, or the lobes are prettily curved outwards, as in the Asperulas. The species, of which there are about 300, belong to the northern parts of the northern hemisphere, and to high mountainous regions in Chili, Peru, and Australia. They have few properties of any account, except in the case of the *Ru'bia*, the roots of which furnish the valuable dye known as "madder."

Sixteen species British, or according to some estimates, twenty-one. Besides these, Mr. Babington mentions *Asper'ula tauri'na* (distinguished by the long tube of the corolla, and leaves four in a whorl) as occurring in Leicestershire and Westmoreland.

A.

FLOWERS PENTAMEROUS. NO TUBE TO THE COROLLA. FRUIT BLACK AND SUCCULENT. Stems 3—5 feet long, very straggling, rough with minute prickles. Leaves in whorls of 4—6, broadly-lanceolate, glossy above, the margins recurved, and rough, as well as the keel, with minute and reflexed prickles. Flowers in panicles, cream-colour or greenish, very abundant, a few of them sometimes tetramerous. Berries the size of small peas, remaining along with the foliage, through the winter. 1. WILD MADDER.

B.

FLOWERS TETRAMEROUS. FRUIT DRY.

1. *Leaves 4 in a whorl.*

a. Flowers yellow. Stems numerous, 1—2 feet long, nearly simple, covered with spreading hairs, weak, and only partially erect. Leaves ovate, flat, soft, and downy. Flowers in axillary corymbose clusters of about 8, the clusters shorter than the leaves, and the peduncle with 2 bracts. Corolla sometimes 3 or 5-cleft, and the stamens corresponding. Upper flowers usually with pistils only; lower ones with stamens only. Fruit glabrous. Whole plant soft and delicate and of a yellowish tinge.
2. CROSSWORT.

b. Flowers white or lilac.

* Flowers in nearly sessile corymbose tufts, and usually lilac. Stems branched, diffuse or ascending, 3—9 inches long. Lower leaves obovate; upper ones linear; the uppermost whorls reduced to two leaves and two stipules. Fruit wrinkled and tubercled.
15. QUINSY-WEED.

** Flowers in panicles.

Fruit smooth. Stems weak and straggling, more or less rough.—Leaves oblong, blunt, tapering at the base, frequently unequal in length, especially those of the upper whorls. Panicles loose and spreading. 4. COMMON MARSH GALIUM.

Fruit rough with hooked prickles. Stems and branches erect, numerous, and leafy. Leaves cruciate, 3-veined, and smooth. Fruit-stalks erect. 8. NORTHERN GALIUM.

2. *Leaves all or mostly 6—8 in a whorl.*

a. Flowers in small umbels, *sessile* in the bosom of the terminal leaves, which form a basket for them. Stems numerous, procumbent, 4—12 inches long, branched and spreading.

Flowers minute, blueish-lilac; two of the sepals cleft. Fruit crowned by the deeply 6-toothed calyx. Whole plant harsh and rough. Leaves in whorls of about six; narrow and pointed.
13. SHERARDIA.

Leaves 6—10 in a whorl, linear-lanceolate and obtuse. Flowers bright blue, surrounded by long ciliated bracteas. Fruit glabrous, large and very conspicuous.
16. BLUE ANNUAL ASPERULA.

b. Flowers in panicles, corymbs, or axillary clusters, but *always upon peduncles.*

* Corolla with a long tube and four narrow lobes. Stems simple except at the base, erect, 2—12 inches high. Leaves about 8 in a whorl, the lower ones obovate, the upper lanceolate, and all edged with bristles that point forwards. Flowers snow-white, in erect, forked and divided clusters which generally grow in threes, the stalks an inch long. Fruit rough with hooked bristles. Plant fragrant, like new hay, when dry. 14. WOODRUFF.

(FLOWERS TETRAMEROUS AND PEDUNCULATE. FRUIT DRY. *Leaves mostly in whorls of* 6—8.)

** Corolla destitute of tube.

† Stem rough with reflexed prickles.

‡ Flowers in terminal panicles. Fruit smooth. Plant perennial.

Leaves 4—6 in a whorl, oblong-lanceolate, *obtuse*, tapering at the base, and frequently unequal in size, especially at the upper part of the plant. Stem weak and straggling. Panicles loose and widely-spreading. Fruit minutely dotted. 4. COMMON MARSH GALIUM.

Leaves 6—8 in a whorl, linear-lanceolate, tapering at each extremity, and *bristle-pointed*, the prickles along the margins directed backwards. Plant seldom more than 12 inches high, slender and brittle. Panicles few-flowered. Fruit minutely tuberculated. 5. SWAMP GALIUM.

‡‡ Flowers in axillary cymes or clusters. Plant annual.

Stems and branches 3—6 feet long, scrambling, and, as well as the leaves, rough with minute prickles that point backwards, and form hooks, by means of which the plant clings tenaciously, even to the fingers.—Flowers whitish, 2—3 together, on short axillary stalks. Fruit a double globe, brown, rough with hooked prickles, and very adhesive. 10. CLEAVERS.

Leaves about 8 in a whorl, lanceolate; their margins, the midrib, and the angles of the stem, which is 12—18 inches high, rough with reflexed prickles. Peduncles axillary and 3-flowered. Fruit reflexed and granulated. 11. CORNFIELD GALIUM.

Leaves about 6 in a whorl, lanceolate, mucronate, and the margins rough. Stems slender and rough. Peduncles axillary, the branches slender, trichotomous, and divaricated. 9. SMALL ROUGH GALIUM.

Leaves 6 in a whorl, lanceolate, the margins rough with minute prickles that point forwards. Peduncles axillary, 3-flowered, the 2 lateral flowers sterile, the central one succeeded by a large and conspicuous fruit, warty on the surface. 12. WARTY-FRUITED GALIUM.

†† Stem without prickles. Flowers in panicles. Plant perennial.

‡ *Flowers yellow.* Stem erect, slender, branched at the base, 1—2 feet high, except on the seaside sandhills, where it is often prostrate, and only 2—3 inches long. Leaves in numerous whorls of 6—8, needle-shaped, grooved, and bent a little downwards. Panicles dense, terminal and erect, golden-yellow and honey-scented. Fruit small, glabrous, and nearly black. Plant deep green. 3. SWEET YELLOW GALIUM.

(FLOWERS TETRAMEROUS AND PEDUNCULATE. Corolla destitute of tube. FRUIT DRY. Stem without prickles. Plant perennial.)

‡‡ *Flowers white or cream-coloured.*

Leaves 8 in a whorl, oblong, elliptical, mucronate, roughish along the margins with little prickles that point forwards. Stems 3—4—6 feet high, slender and straggling. Panicle loose and spreading. Segments of the corolla tapering into hair-like points. Fruit quite smooth. 7. GREAT HEDGE GALIUM.

Leaves about 6 in a whorl, obovate and pointed, usually without marginal prickles. Stem much branched, glabrous, prostrate at the lower part, 6—18 inches long. Panicles small, numerous, dense, and both lateral and terminal. Fruit minutely granulated. 6. SMOOTH HEATH GALIUM.

HABITATS AND DISTRIBUTION.

1. WILD MADDER—*Ru'bia peregri'na.*

Dry woods, and among bushes on limestone rocks and cliffs. In the south-western counties of England common, especially near the sea; elsewhere little known, but abundant in some parts of North Wales, as at Llandudno and between the Menai Bridge and Beaumaris. In Scotland not found. Fl. July, August.

E. B. xii. 851; Baxter, ii. 135.

The madder-roots of commerce, so valuable for their deep-red dye, are supplied by the *Ru'bia tincto'rum*, a plant scarcely differing from the *peregri'na.*

2. CROSSWORT—*Ga'lium crucia'tum.*

Hedgebanks, especially among stouter plants, against which it leans for support, the roots difficult to get at. Sometimes upon grassy hills. Common, except in the remoter parts of Scotland, and in Ireland apparently not found. Extremely abundant by the roadside between Skipton and Bolton Abbey. Fl. May, June.

E. B. ii. 143.

A very pretty plant, conspicuous in the hedges from its yellowness. The glabrous yellow fruit may be found at the close of autumn, when also there is great abundance of leafy shoots.

3. SWEET YELLOW GALIUM—*Ga'lium ve'rum.*

Dry hedgebanks and waysides, margins of dry fields, and particularly on grassy slopes by the sea, and on the seaside sandhills. Abundant in most parts of Great Britain. Fl. July, August.

Curtis, ii. 377; E. B. x. 660; Baxter, iv. 294.

When luxuriant, an extremely pretty and cheerful plant, the yellow clusters a foot in length, and when mingling, as not uncommonly, with the white *Mollu'go,* making the hedgebanks seem silver inlaid with gold. On the seaside sandhills it is often very much reduced, and the panicles are only 1—2 inches long.

4. Common Marsh Galium—*Ga'lium palus'tre.*

Sides of ditches and ponds, in the miscellaneous tangle of reeds, forget-me-not, water-mints, and other late-flowering semi-aquatics, upon which it leans for support. Common everywhere. Fl. July, August.

Curtis, iii. 451; E. B. xxvi. 1857.

The *Ga'lium Withering'ii* of E. B. xxxi. 2206 differs from this only in its rough-edged leaves. Some refer it to the following species:—

5. Swamp Galium—*Ga'lium uligino'sum.*

Similar situations, but less common. Fl. July, August.

Curtis, iii. 452; E. B. xxviii. 1972.

6. Smooth Heath Galium—*Ga'lium saxat'ile.*

Heaths, and hilly pastures, where the turf is short, the leafy branches matted together, and often making the ground quite white with its summer snow; also on dry banks and cliffs, and often hanging out of fissures in rocks. Common everywhere. Fl. June—August.

E. B. xii. 815.

To this species are referable the *Ga'lium pusil'lum* of E. B. ii. 74, (called in Mr. Babington's Manual, *Ga'lium sylves'tre)* also the "*Ga'lium monta'num*" and the "*Ga'lium commuta'tum.*"

7. Great Hedge Galium—*Ga'lium Mollu'go.*

Hedges and thickets, leaning against the bushes; sometimes in the open fields on dry hills, and then of more independent habit, and smaller. Common in most parts of England; rather rare in Ireland, and extending only a little way into Scotland. Fl. July, August.

E. B. xxiv. 1673.

The smaller states of this rather variable species have been distinguished from it under the names of *Ga'lium erec'tum,* (E. B. xxix. 2067.) *Ga'lium cine'reum,* (Supp. ii. 2783.) *Ga'lium arista'tum,* (Supp. ii. 2784.) and *Ga'lium insu'bricum.*

8. Northern Galium—*Ga'lium borea'le.*

Moist rocky and shady places, especially on the borders of streams. Common in most of the northern parts of the island, in North Wales, and in Ireland. Widdy Bank, Durham, very abundant. Fl. July, Aug.

E. B. ii. 105.

9. Small Rough Galium—*Ga'lium Parisien'se.*

Dry waste and sandy places, and upon old walls in the south-eastern counties; rather rare. Fl. June, July. Annual.

E. B. vi. 384 (as *Ga'lium Ang'licum).*

10. Cleavers—*Ga'lium Apari'ne.*

Hedges and waste places, everywhere, straggling up among the stouter plants. Fl. June, July. Annual.

Curtis, i. 81; E. B. xii. 816.

The notorious adhesiveness of the stems and leaves to our clothing is expressed in a variety of rustic names, as "catchweed" and "stickle-back." The little pale brown fruits, covered with hooked bristles, cling with equal tenacity, and during uncareful autumn rambling may be observed a score at once upon the sleeve.

Small varieties, with rather more flowers in a cluster, and of a greener tint, and with fruits only about half the size of those of the common form of the plant, are distinguished by some botanists as *Ga'lium spu'rium*, when the fruit is smooth, (E. B. xxvi. 1871.) and as *Ga'lium Vaillant'ii*, when it is rough (Supp. iv. 2943.) The latter form of the plant is considered peculiar to the county of Essex, and is there found chiefly near Saffron Walden.

11. CORNFIELD GALIUM—*Ga'lium tricor'ne.*

Dry cornfields, often growing up more vigorously after harvest. Rare, and only found in the south. Horfield, near Bristol. Isle of Wight. Fl. July, August. Annual.

E. B. xxiii. 1641.

12. WARTY-FRUITED GALIUM—*Ga'lium sacchara'tum.*

Cornfields; extremely rare, being to all appearance an introduced plant, like many other casual companions of the cereals, and not maintaining its hold for more than a year or two. Fl. June—August. Annual.

E. B. xxxi. 2173 (as *Ga'lium verruco'sum.)*

13. SHERARDIA—*Sherar'dia arven'sis.*

Borders of dry fields, and in dry arable land; sometimes by waysides, where the soil is gravelly. Common, except in the north of Scotland. Fl. June—September. Annual.

E. B. xiii. 891; Baxter, iv. 244.

14. WOODRUFF—*Asper'ula odora'ta.*

Shady woods, glens, and cloughs, growing in great patches. Common everywhere. Extremely abundant near Manchester. Fl. May, June.

Curtis, ii. 232; E. B. xi. 755; Baxter, i. 46.

A truly elegant little plant, with snow-white blossoms, the herbage, while fresh, scentless or nearly so, but when dry, with the odour of new hay. Often in gardens.

15. QUINSY-WEED—*Asper'ula Cynanch'ica.*

Dry sunny banks; grassy spaces in dry woods, among moss and wild thyme; and on the borders of dry fields, where the soil is chalky or calcareous. Common in most parts of the south and west of England and in Ireland, but in Scotland unknown. Fl. June—August.

E. B. i. 33.

16. BLUE ANNUAL ASPERULA—*Asper'ula arven'sis.*

Waste places; very rare, and certainly introduced. Devonport. Fl. July. Annual.

E. B. Supp. iii 2792.

The only members of this family found in gardens are the common woodruff; the *Crucianel'la stylo'sa*, a low-growing plant with lilac flowers in terminal umbels; and one or two dwarf *Ga'liums* and *Valan'tias*, as *Ga'lium linifo'lium* and the yellow and sweet-scented *V. Tau'rica* (Bot. Mag. liii. 2670).

CXXVIII. THE HONEYSUCKLE FAMILY.—*Caprifolia'ceæ.*

Shrubby and occasionally herbaceous plants, with opposite leaves, flowers of five partially united petals, and a small fixed number of stamens (usually five) seated upon the corolla. Calyx very small. Ovary solitary, inferior, and 3—5-celled; fruit usually a berry.

If the character of "interpetiolar stipules" were added to the above, the description would apply to the *Cinchona'ceæ*. But these organs are not developed in the family before us, and their absence serves negatively to distinguish it from the former. There are great differences, without doubt, in the general aspect of the two families, and it is not likely that a member of either would be referred to the wrong place; but on putting the characters side by side, absolutely nothing remains as not common to both, except this simple feature in the Cinchonaceæ of interpetiolar stipules. Some of the most noticeable points of difference consist in the occasionally serrate, and the occasionally *quasi*-pinnate leaves of the Caprifoils; also in their occasionally twining stems, and a tendency to irregularity in the corolla. The species amount to over 200; they are natives mostly of the northern parts of the northern hemisphere, and are recommended by properties of considerable interest. Independently of the fragrance of the honeysuckle, the virtues of the elder-tree are enough to attract attention.

Eight occur in Britain, most of them truly wild, and the others so completely naturalised as to appear so.

A.

Stems twining, slender and cord-like, mounting up and over bushes and small trees often to the height of many yards. Leaves ovate or oblong, and usually entire. Flowers in terminal heads, yellowish or pinky, and very fragrant.—Corolla an inch and a half long, and irregularly 2-lipped Calyx minute. Anthers versatile. Style long and slender. Berries the size of a pea, and densely clustered.

* All the leaves free at the base. Head of flowers pedunculate. Berries crimson and translucent. 1. WOODBINE.

** Uppermost pair of leaves (and sometimes two pairs) *connate*, so that the stem appears to pass through the centre of a broadly-oblong leafy plate. Head of flowers sessile, and sometimes with a whorl of flowers in the pair of connate leaves next beneath. Fruit orange-coloured. 2. ITALIAN HONEYSUCKLE.

B.

Stems erect, or at least not twining.

- * Shrub. Flowers two together, on short peduncles in the axils of the leaves. Stems 3—6 feet high and very branchy. Leaves ovate, entire, 1½—2 inches long, and covered with soft down. Corolla pale yellowish-white, about half an inch long, downy, and scentless. Berries crimson. 3. FLY-HONEYSUCKLE.
- ** Flowers in cymes of 2—6 inches in diameter, numerous, regular, and white or cream-coloured.
  - *a.* Leaves *quasi*-pinnate, the segments serrate. Berries usually black.
    - Herbaceous plant with annual stems 2—3 feet high. Segments of the leaves 7—11, lanceolate, the lowest short, broad, and close to the stem. Cymes with three principal branches. Tips of the petals red and incurved. 5. DANEWORT.
    - Small and bushy tree. Segments of the leaves 5—7, ovate, the upper ones often confluent. Cymes large and with five principal branches. Flowers cream-coloured and fragrant. Berries sometimes green or the colour of white grapes. 4. COMMON ELDER.
  - *b.* Tall shrub or small tree, glabrous in every part. Leaves entire, 2—3 inches across, divided to near the middle into three broad, angular, and pointed lobes. Petioles beset with little warts at the upper part. Flowers in cymes 2—3 inches in diameter, the inner ones small and perfect, the outer ones much dilated, nearly flat, destitute of stamens and pistil, and forming a ray or border like that of the *Hydran'gea.* Berries globular, yellowish while young, when ripe translucent crimson, and hanging on the tree till shrivelled by the frost. 6. WILD GUELDER-ROSE.
  - *c.* Large, much-branched, and durable shrub. Leaves ovate, 2—4 inches long, serrate, shortly petiolate, the upper surface green and rough, the lower one very veiny, and, as well as the petioles and young branches, thickly crusted with buff-coloured scurf that, when rubbed off, resembles sea-sand. Flowers small and white. Berries flattened, green at first, afterwards red, eventually black. 7. WAYFARING-TREE.

C.

Stems creeping and trailing upon the ground, 6—12—18 inches long, and somewhat entangled. Leaves obovate, slightly toothed, and evergreen. Flowering-branches erect, 2—3 inches high, with 2—3 pairs of leaves, and terminating in a long peduncle, from the summit of which hang two very elegant pinkish or yellowish and fragrant blossoms each about half-an-inch in length. 8. LINNÆA.

HABITATS AND DISTRIBUTION.

1. Woodbine—*Lonice'ra Pericly'menum.*

Hedges and woods, everywhere, mantling the former till they are often nearly concealed, and in the latter often climbing to the very tops of the smaller trees. Fl. summer and autumn.

Curtis, i. 15; E. B. xii. 800; Baxter, iv. 287.

The twining stems, by their powerful constriction of young and soft-wooded trees while growing, often cause the latter to be deeply and spirally furrowed, though this is not discovered till both are cut down. They turn from left to right, in this respect agreeing with the *Tamus* and the *Polyg'onum Convol'vulus*, and disagreeing with the great white Bindweed and the scarlet-runner, both of which curl from right to left. The leaves are among the earliest of the spring, often being out in January, and in summer are abundantly marked with pale and curving lines and winding tracks, the work of the little grub of some dipterous insect, which in those parts has eaten away the cellular tissue, but left the cuticle untouched. No other English leaf-miner bequeathes such conspicuous evidence of its activity. A variety, found occasionally in hedges, and cultivated sometimes in gardens, has the leaves indented like those of the oak. The flowers, in their pretty details, yield to none. The cleft extremities of the corolla roll back, and disclose the five long stamens with their versatile anthers, that swing like those of a lily; the long style in the centre is tipped with a green stigma, and at the base of the long tube lies that copious nectar which has right well gained for this plant the loving synonym of "honeysuckle." Shakspere, as if loth to exclude either name, brings them together in one beautiful picture,—that where Beatrice lies "couched in the woodbine couverture" which he has just before described as

> "The pleachēd bower,
> Where honeysuckles, ripened by the sun,
> Forbid the sun to enter."

Some botanists call the honeysuckles by the generic name of *Caprifo'lium.*

2. Italian Honeysuckle—*Lonice'ra Caprifo'lium.*

A south-European species and very old inhabitant of English gardens, in which it is used especially as flowery thatch for cottage porches, and for trellis-work. Now naturalised in many places. Fl. May, June.

E. B. xii. 799.

3. Fly-honeysuckle—*Lonice'ra Xylos'teum.*

Wild in woods and hedges in the south of England, and elsewhere not uncommon, but probably introduced, being one of the most frequent and old-fashioned shrubs in cultivation. Fl. May, June.

E. B. xiii. 916.

4. Common Elder—*Sambu'cus ni'gra.*

Woods and hedges everywhere in England, apparently wild, though possibly introduced from the continent originally, on account of its medicinal fame, and in Scotland certainly introduced. Fl. May—July.

E. B. vii. 476.

Elder is remarkable for its rapid growth while young, and its stationary character when 20—30 feet high, and as many years old, though it endures apparently for centuries. On the eastern declivity of the Herefordshire Beacon, Malvern hills, there are countless old elders, quaintly hung with the odd fungus called the Jew's ear, or *Hirne'ola Auric'ula-Judæ*. The individual virtues alike of the leaves, the flowers, and the fruit, have given it celebrity from the earliest history of pharmacy, and account for its being so often associated with the ruined castles and monasteries of the middle ages, at least upon the continent. In Kent there are elder-orchards, but in gardens this tree is not cared for, being lumpish and ungraceful in general figure, and the masses of heavy umbels devoid of floral beauty. Many varieties are known, and most of them are common, such as the green-berried; the white-berried; and the *lacinia'ta* or cut-leaved, which has the leaves finely and doubly pinnatifid. The trifoliolate and the variegated are less usual.

5. Danewort—*Sambu'cus Eb'ulus.*

Roadsides, hedgebanks, and waste places among bushes and grass. Not uncommon. Fl. July.

Curtis, i. 163; E. B. vii. 475; Baxter, ii. 122.

6. Wild Guelder-rose—*Vibur'num Op'ulus.*

Moist woods and glens, banks of rivers, and by streams; very common, except in Scotland. Fl. June.

E. B. v. 332.

When in bloom, this is one of our most beautiful wild flowering-trees, the large flat white corymbs gleaming from afar amid the green of the "leafy month of June;" and when hung with its lucid fruit in autumn, and the leaves aspire to be blood-red, the spectacle is hardly excelled by the mountain-ash. Viewed from below, as in the upper paths of Leigh woods, and others upon hill-sides, with the clear blue sky alone beyond them, and the sunshine falling through, the berries surpass in richness the finest and ripest of red currants, and when gathered, seem bunches of crimson grapes. In August, they resemble little "white-heart" cherries, rosy upon one side, but are as bitter as quinine. The "Guelder-rose" or "snowball-tree" of the garden is the same species, with the whole of the flowers changed into the large flat neuter condition, causing the cyme to assume a globular shape.

7. Wayfaring-tree—*Vibur'num Lanta'na.*

Woods and hedges. Common in the south of England, especially upon limestone; elsewhere seldom met with, and in Ireland not found. Leigh woods, near Bristol, plentiful. Fl. May, June.

E. B. v. 331; Baxter, ii. 128.

The leaves, like those of the wild guelder-rose, in autumn acquire a rich blood-red colour, especially observable in the smaller ones.

8. Linnæa—*Linnæa borea'lis.*

Fir-woods and heaths in the east of Scotland; rare. Craibstone, near Aberdeen. Fl. June, July.

Curtis, iv. 627; E. B. vii. 433; Baxter, v. 340.

Several foreign honeysuckles occur in gardens, and others in greenhouses, all in general character much like our native woodbine. One of the most valuable is the *Lonice'ra Japon'ica*, a hardy evergreen twiner with ovate leaves, and highly fragrant flowers. *Lonice'ra sempervi'rens*, (Bot. Mag. xlii. 1753.) the "evergreen trumpet-honeysuckle" from North America, has umbels of fine scarlet flowers, with the mouth of the corolla nearly regular, and the upper pairs of leaves connate. *Lonice'ra Tatar'ica*, the Siberian Fly-honeysuckle, is a very common shrub with erect branches and small axillary pink flowers resembling those of the *Xylos'teum*, but larger. Little as this last resembles woodbine, the other members of the family grown for ornament are still less like it; *Weige'la ro'sea*, for example. (lxxiv. 4396.) one of the most showy and useful shrubs introduced for many years, and for which we are indebted to recent botanical enterprise in Japan. The large somewhat campanulate rose-and-white flowers are produced in copious clusters, every corolla upon the summit of an ovary so long and slender as, without very close inspection, to be mistaken for a peduncle. It flowers freely when only 2—3 feet high, and when twice or thrice that stature, and loaded with bloom, is truly splendid. *Leyceste'ria formo'sa*, (lxv. 3699.) often called the "flowering-nutmeg," though without the least resemblance or affinity to the true nutmeg, is a very handsome and singular shrub from northern India. The leaves are ovate-lanceolate, and several inches long; the white flowers are produced in the axils of immense and deep red bracts disposed in whorls that are gradually smaller towards the extremity, the whole forming a great pendulous raceme 4—8 inches long, which from a broad base gradually tapers to a point, and terminates the branch, hanging with the point towards the earth. The branches are numerous, and, before the uppermost flowers are over, the earlier ones are succeeded by purple berries. Quite as beautiful in its way is the snowberry or *Sympho'ria racemo'sa*, that universal and cheerful bush which towards autumn is dressed all over with milk-white berries the size of a marble, still mingled with which are many of its little pink flowers, the latter hairy upon the inner surface. The snowberry is a native of the western states of North America and especially of the banks of the Missouri. The Laurustinus, thrice invaluable alike for town and country, is botanically a *Vibur'num*, bearing for its specific name that under which Ovid alludes to the blue berries—

> Et bicolor myrtus, et baccis cærula Tinus.

This charming shrub is a native of the south of Europe and the north of Africa, and, blooming from November to April, is one of the most valuable plants we possess. Not only are the corymbs of white flowers, the pink buds of the unopened ones, and the shining and evergreen leaves, a delightful spectacle when nearly everything else is bare, but the varied and picturesque forms which the masses of foliage assume when it is let grow tall, at every season confer on it a peculiar elegance. Several others of the genus are in occasional cultivation, as *Vibur'num Lenta'go, læviga'tum, rugo'sum*, and *macroceph'alum*; also the *Sambu'cus racemo'sus*, an elder with red berries; some *Lonice'ras* that would hardly be supposed allies of the honeysuckle, such as the *Lonice'ra involucra'ta*, so named from its handsome involucrum of deep red bracts an inch across; and a little yellow-flowered shrub called *Diervil'la Canaden'sis* (xliii. 1796.)

CXXIX. THE GOOSEBERRY FAMILY.—*Grossula'ceæ.*

Shrubs, occasionally armed with thorns. Leaves alternate, exstipulate, usually on long petioles, fan-lobed in three or five divisions, usually serrate, and, while in the bud state, plaited. Flowers regular, axillary and solitary, or in axillary racemes Calyx five-parted, often the largest and showiest part of the blossom; petals five, frequently minute; stamens five, usually very small; ovary solitary and inferior, ripening into a juicy and many-seeded berry, and bearing the withered relics of the flower upon its summit. The seeds are attached to two opposite and parietal placentæ, and suspended among the pulp by long stalks; the pedicels are always bracteated; the flowers are sometimes unisexual and even diœcious, by abortion; and in one or two rare instances, as *Ri'bes specio'sum*, the parts of the flower are in fours.

Scarcely more than the genus *Ri'bes* is included in this family, which is abundantly represented, nevertheless, in the woods and thickets, and upon the mountains, of all the temperate parts of Europe, Asia, and America. It occurs also in the South Sea Islands, in the plants called *Polyos'ma*, but in Africa there is no known example. Nearly a hundred species have been registered, many with beautiful flowers, and a few, such as the common currant and gooseberry, producing excellent fruit. The berries of the ornamental species have generally a mawkish or extremely acid taste, in place of the agreeable flavour for which the latter are esteemed. When the gooseberry and currant, as we know them in England, are taken to warm countries, they become evergreens, and cease to bear fruit. In countries where the vine, the fig, and the olive are the staple fruit-trees, these simple children of the north seem abashed; but as soon as those three patricians feel the cold, the gooseberry and the currant bestow their bounty.

Four species grow wild, or apparently so, in Britain, but whether any except the *Ri'bes alpi'num* be truly indigenous, is open to doubt, the fruit-bearing species having been cultivated in our island for many ages, and readily springing up from chance-thrown seeds.

A.

Stem and branches thorny beneath the leaf-buds. Lobes of the leaves rounded. Peduncles 1—2-flowered. Sepals reflexed until after the fertilisation of the pistil. 1. Common Gooseberry.

B.

Stem and branches thornless. Flowers green and racemose.

- Bracts longer than the flowers, which are usually unisexual and diœcious. Racemes erect. Leaves small, and, on the under-surface, shining. Berries red and tasteless. 2. Mountain Currant.

(Stem and branches thornless. Flowers green and racemose.)

** Bracts shorter than the flowers, which are always bisexual. Racemes usually pendulous.

Leaves glandular and fragrant. Flowers cup-shaped and downy. Lower pedicels longer than the upper ones. Berries black and opaque. 3. BLACK CURRANT.

Leaves neither glandular nor fragrant. Flowers glabrous and nearly flat. Pedicels all short. Berries red, shining, and translucent. 4. RED CURRANT.

HABITATS AND DISTRIBUTION.

1. COMMON GOOSEBERRY—*Ri'bes Grossula'ria.*

Woods, thickets and hedges; common. Fl. March, April.

E. B. xviii. 1292.

Trained against the wall of a house, the gooseberry will grow to the height of 20—30 feet. The hairy-skinned varieties were formerly deemed a different species, and called *Ri'bes Uva-cris'pa.* (E. B. xxix. 2057.)

2. MOUNTAIN CURRANT—*Ri'bes alpi'num.*

Woods and wildernesses, and often in hedges. Chiefly in the north of England and the south of Scotland. Everywhere about Ambleside. In Ireland not found. Fl. April.

E. B. x. 704.

The name *alpi'num* is ill applied, the plant being found as often in lowland regions as upon high mountains. In the spring it is green before any other shrub, on which account it is occasionally grown in gardens.

3. BLACK CURRANT—*Ri'bes ni'grum.*

Moist woods and thickets; not uncommon. Banks of the Mole, Esher, Surrey. Fl. April.

E. B. xviii. 1291.

4. RED CURRANT—*Ri'bes ru'brum.*

Woods and hedges, especially near little streams; common. Banks of the Tees, Isle of Isla, and Culross woods, Scotland, "undoubtedly wild." Fl. April.

E. B. xviii. 1289; Baxter, v. 345.

In gardens, like the others, universal, and with many varieties. The common "white currant," the "Normandy pink," and the very pretty "Austrian currant," which has the pale berries striped with red, are esteemed for their fruit; another, with the leaves variegated, forms an agreeable contrast in the shrubbery. The *Ri'bes spica'tum* of E. B. xviii. 1290, is a form of this plant with the "flowers almost sessile." It is probably now extinct as a wild plant. *Ri'bes petræ'um,* abundant in Switzerland, and formerly believed to be British, is not native, the plant figured under that name in E. B. (x. 705.) being only *Ri'bes ru'brum* with the racemes erect.

The special abode of the Grossulaceæ is North America, from the north-western parts of which continent we have received all the best of the ornamental species, including that charming one now considered indispensable to every garden, and popularly known as the "scarlet-flowering currant." This beautiful plant, which hangs out its copious racemes to the earliest sunshine of the spring, was introduced only in 1826, yet has made its way quite as extensively as the fuchsia. There is a rich variety with double crimson flowers, further valuable as blooming a little later in the season. The leaves of this species, botanically *Ri'bes sanguin'eum*, correspond in odour with those of the common black-currant, and furnish excellent illustrations for the microscope of the peculiar glands that contain the fragrant matter in all such plants. The broad perules of the buds often have little leaves at their extremities, that show excellently the true nature and relation of bracts. Among the thorny species, *Ri'bes specio'sum* (Bot. Mag. lxiii. 3530.) almost rivals the *sanguin'eum*. At the base of every cluster of leaves there is a strong triple spine; the glittering and tetramerous flowers, which grow in pendulous racemes of 3—5, resemble those of a fuchsia, the long scarlet calyx being the most conspicuous part, and the four red stamens and style twice or thrice as long. This admirable shrub is nearly an evergreen, there being an almost continuously new growth of small leaves from every bud. *Ri'bes au'reum*, or the golden-flowering gooseberry, is distinguished by its large and glossy leaves, and bright yellow calyx, with a ring of little scarlet petals in the centre. The flowers of *Ri'bes ni'veum* are white as snow, while its branches are thorny. *Ri'bes multiflo'rum* has racemes of green flowers, long and remarkably elegant. *Ri'bes lacus'tre* combines the yellowish-green flowers of the currant with the prickly stems of the gooseberry, and when the fruit is ripe, again reminds us of the former, the berries resembling those of the *Ri'bes ni'grum*. Several other species are cultivated in arboretums and Botanic Gardens, from which, however, they are not likely to spread far, the flowers being unattractive.

CXXX. THE ESCALLONIA FAMILY.—*Escallonia'ceæ.*

American and Australian shrubs, related to the *Grossula'ceæ*, from which they are technically distinguished by the capsular fruit. They are chiefly known in our gardens in the exceedingly beautiful hardy or half-hardy *Escallo'nia macran'tha*, from Chili. (Bot. Mag. lxxv. 4473.) When trained against a wall, this grand shrub rises 6—8 feet high, producing abundance of fine glossy, aromatic, and evergreen foliage, and racemes of rich crimson flowers, the latter in July, and towards the ends of its numerous and twiggy branches. The leaves are alternate, ovate-elliptical, serrate, destitute of stipules, 3—4 inches long, leathery, very dark green, and covered, on the under surface, with dewy scent-glands; the flowers are pentamerous, with the ovary three-parts inferior; and the capsules, when ripe, which is cotemporaneously with later flowers, are found full of minute seeds. Other ornamental species are *Escallo'nia ru'bra*, also from Chili, *Escallo'nia Organen'sis*, from Brazil, (lxxii. 4274.) and the white-flowered *Escallo'nia Monte-*

viden'sis. All are evergreen, and more or less aromatic. *I'tea Virgin'ica* (l. 2409.) is an erect and deciduous shrub from North America, attaining the height of six or seven feet. The leaves are ovate-lanceolate, toothed and acute; the little pentamerous white flowers are produced in simple and terminal racemes. *Anop'teris glandulo'sa* (lxxiv. 4377.) introduced from New Holland in 1823, is a fine-looking greenhouse tree or large shrub, with handsome elliptical and serrate leaves, and simple and terminal racemes of white flowers, tinged, more or less, with purple. Unlike the other members of the family, it has a 6 or 7-lobed calyx, and six petals. The ovary is inferior and one-celled.

CXXXI. THE WHINBERRY FAMILY.—*Vaccinia'ceæ.*

Shrubs of low growth, or small trees, frequently evergreen, and usually much branched. Leaves simple, alternate, undivided, more or less oval, and frequently serrate. Flowers solitary or in racemes. Calyx 4—6-lobed, the tube adherent to the ovary, rendering it "inferior," and the free portion often extremely minute. Petals 4—6, usually so far coherent by their edges as to form an ovoid or bell-shaped corolla. Stamens twice as many as the lobes of the perianth, the anthers opening by pores at the extremity, like those of heaths. Fruit a globular and juicy berry, in colour black, red, or deep-blue, and crowned by the permanent calyx-teeth.

These plants so closely resemble the Ericaceæ, that the only absolute point of distinction is the inferior ovary. Authors who adopt the views of Decandolle, and consider the position of this organ unimportant, of course do not hesitate to combine the two families, and make the Vacciniaceæ a section of the former.

The species abound in all the temperate parts of the world, and flourish especially in swampy and subalpine districts. The bark and leaves are astringent; the fruit is subacid, and pleasant to eat when cooked. Cranberries and whortleberries are well known and valuable in the latter respect; many others of the family form pretty shrubs for garden ornament.

Four grow wild in Britain.

A.

Corolla rose-coloured, deeply 4-lobed, the lobes reflexed so as to expose the stamens, which form a central yellow cone. Stems as fine as horse-hair, 10—20 inches long, prostrate, and forming much-entangled masses. Leaves minute, oval, entire, evergreen, gray underneath. Peduncles terminal, 1—2 inches long, 2—3 together, the flowers not more than 2—3 inches above the ground, and half-pendulous. Berries pale-red, mottled with purple. 4. CRANBERRY.

B.

Corolla bell-shaped, or urn-shaped, the stamens not projecting.

- * Flowers solitary and axillary. Plant 6—20 inches high. Branches numerous, green, erect, angular, and very tough. Leaves ovate, pointed, serrate, nearly sessile, deciduous, and often turning red before they fall. Calyx a mere green rim, scarcely 5-notched. Corolla nearly globular, about one-fourth of an inch long, wax-like, and greenish-red. Berries nearly black. 1. Common Whortleberry.
- ** Flowers in short, dense, terminal, and drooping racemes, usually pale flesh-colour. Leaves obovate and entire.
  - Leaves thick and leathery, glossy, evergreen, and resembling those of the box-tree. Plant much branched, 6—12 inches high, more or less procumbent and straggling. Stems woody. Corolla with four pointed and rather spreading lobes. Berries red. 3. Cowberry.
  - Leaves thin, veiny, and deciduous. Branches with scarcely perceptible angles. Berries purple. 2. Great Whortleberry.

HABITATS AND DISTRIBUTION.

1. Common Whortleberry—*Vaccin'ium Myrtil'lus.*

Moors, heaths, mountains, and dry woods; common, except in the eastern counties. One of the principal plants of the hills in the north where sportsmen go for grouse. Fl. April, May, and sometimes again in September. Berries ripe in August.

E. B. vii. 456.

The fruit is brought in great plenty to the markets of such districts as the plant belongs to, and called in different parts by the various names of "whortleberries," "bilberries," and "whinberries." In Manchester it is much esteemed.

2. Great Whortleberry—*Vaccin'ium uligino'sum.*

Mountainous heaths and bogs; abundant in the Highlands of Scotland, and not uncommon in the north of England, but in Ireland not found. Fl. April, May.

E. B. ix. 581.

3. Cowberry—*Vaccin'ium Vitis-Idæ'a.*

Dry heaths, rocky moors, and subalpine hills, generally mingled with heather and whortleberry, and often growing in large patches. Common in most parts of Great Britain and Ireland, excepting the low districts of the east of England, and upon limestone, which rock it never affects. East Lancashire, abundant. Fl. May, June.

E. B. ix. 598; Baxter, v. 383.

Commonly grown in gardens under the name of "flowering-box." When out of bloom this plant somewhat resembles the *Arctostaph'ylos Uva-ur'si*, but it may readily be distinguished by the dots upon the under-surface of the leaves, which part, in the *Uva-ur'si,* is reticulated. "Vitis-Idæa," like "Parnassia," seems charged with classic fame. But the Vaccinia of the ancients were not fruits, but some kind of flowers, possibly hyacinths, since a line in Virgil which includes the name Vaccinium is an adaptation of one in Theocritus, where the hyacinth is manifestly the flower intended. (Eclogue, ii. 18; Idyll x. 28.) There is also the passage in Claudian—

> "Sanguineo splendore rosas, vaccinia nigro
> Induit, et dulci violas ferrugine pingit."

This likewise would seem to point to the hyacinth, or, if not to that, at least to some dark-complexioned flower.

4. CRANBERRY—*Oxycoc'cos palus'tris.*

Wet moors and peat bogs; widely diffused, but not very common, owing to the peculiar nature of its habitat, and in future likely to become rare, through the progress of drainage and cultivation. Fl. May, June.

E. B. v. 319 (as *Vaccin'ium Oxycoc'cos)*; Baxter vi. 429.

The cranberry, like the whortleberry, is brought to the fruit-markets in localities and districts where it is plentiful. The little hair-like branches preserve the woody character of the family, and entitle this plant to be called the smallest of evergreen shrubs.

The cranberries imported from America are the produce of the *Oxycoc'cos macrocar'pum,* (Bot. Mag. li. 2506.) a plant not widely known to English gardens, where, however, there are several species of exotic *Vaccin'ium.* The latter genus is seldom ornamental, but others of the family make more than amends, especially those beautiful South American shrubs by which the family is represented in the greenhouse. *Maclea'nia angula'ta* and *puncta'ta,* (Bot. Mag. lxix. 3979; lxxv. 4426.) both from the Peruvian Andes, have clusters of rose and yellow flowers; *Ceratoste'ma longiflo'rum,* also from Peru, has long and tubular crimson blossoms, borne, like those of the preceding, in clusters which are either terminal, or mingled with the upper leaves; *Gaylussac'cia Pseudo-vaccin'ium,* from Brazil, has very handsome racemes of rose-coloured or crimson flowers, the blossoms disposed along the stalk in such a way as to be almost unilateral; *Thibau'dia pulcher'rima* and *macran'tha,* from northern India, (lxxiii. 4303; lxxvii. 4566.) have their flowers most beautifully chequered with white, red, and yellow, after the manner of the snake's-head lily. As in many others of the family, they are clustered in axillary and umbellate racemes. *Thibau'dia variega'ta* is by some generically distinguished as *Agape'tes.*

CXXXII. THE MOCK-ORANGE FAMILY.—*Philadelpha'ceæ.*

Ornamental shrubs and small trees, foreign in every species, and hence only known in gardens, but there very familiarly in the celebrated and fragrant "syringa," or mock-orange, *(Philadel'phus corona'rius)* a native of the south of Europe. Ordinarily this tree rises to the height of 8 or 10 feet, producing abundance of ovate, acuminate, finely serrate, and nearly glabrous leaves; and racemes of large cream-white flowers, usually four-petaled, with numerous stamens, and a powerfully-aromatic odour, resembling that of orange-blossom. So hardy is it, so easily propagated, and so indifferent to soil, that it is found in every shrubbery from the Mediterranean to St. Petersburgh. The blossoms are at once distinguished from those of the true orange-tree by their four styles and inferior ovary; they are often substituted, however, for those of the orange in bridal bouquets, and then frequently called "citron-blossom." The leaves have the flavour of cucumber. *Philadel'phus inodo'rus*, (Bot. Mag. xxxvi. 1478.) a native of the Carolinas, has larger and handsomer flowers, but as they are scentless, and the plant is rather tender, it is seen but seldom. To this family likewise belong the very interesting shrubs called *Deut'zia*, the leaves of one of which supply a well-known and extremely beautiful microscopic object in the white silicious stars that bestrew the surface. In our shrubberies the *Deut'zia sca'bra* attains the height of 6—8 feet; the leaves are ovate, acuminate, and serrate, and the white flowers are produced, a few together, in racemose panicles. *Deut'zia gra'cilis* and *Deut'zia hu'milis* are extremely pretty little greenhouse shrubs, with ovate-lanceolate leaves, and profusion of milk-white but scentless flowers, in delicate half-pendulous racemes, the buds, before expansion, resembling caraway-comfits. Both blossom early in the spring, and at that season appear plentifully in ladies' posies and bridal bouquets. They are natives, like the *Deut'zia sca'bra*, of Japan. The filaments of the ten stamens are remarkably broad and flat, and have two little pointed shoulders, between which stands the yellow anther; the number of styles varies from three to four, or even five. For the binocular microscope, the calyx is a charming object, being covered with stars like those upon the leaf of the *sca'bra*, but more delicate. *Decuma'ria Bar'bara*, the only other cultivated representative of this group, (excepting a few rare species of *Philadel'phus)* is a deciduous climbing shrub from Lower Carolina, with white and fragrant flowers much of the same character as those of the mock-orange.

CXXXIII. THE CHILI-NETTLE FAMILY.—*Loasa'ceæ.*

Stings, such as we are familiar with in the nettle, are found also in a few other plants, and help to characterise the principal portion of the Loasaceæ, which in other respects are pleasing garden and greenhouse flowers. The species, to the number of 70, are exclusively American, and though possessed of well-marked affinities with several other families, as those named after the Cactus and the Passion-flower, in essential characters and aspect they are unmistakeable. All are herbaceous, though in a few cases they are twiners; the leaves are usually feather-lobed, and more or less deeply cut and serrate, though sometimes undivided; the flowers are regular, pentamerous, yellow, white, orange, or reddish, and usually upon solitary and axillary peduncles, which are generally rather long; the large and inferior ovary is spirally grooved; and the stamens are generally numerous and polyadelphous. In the typical genus the five large petals are concave and boat-shaped, and spread out star-wise, and in every one of them, when the flower first opens, there is found a recumbent cluster of stamens. By degrees the stamens rise up, in order to fertilise the pistil, and eventually the whole form a vertical sheaf in the centre, surrounding and concealing the style. This part is also protected from view by five inner petals of a different colour, which form an intermediate whorl with the others, and are usually cleft into five finger-like lobes, two of which are longer, while the three shorter ones have coloured heads. The interior summit of the ovary is broad, green, and flat, and the exterior is covered with stings, like the remainder of the plant. Under the microscope the Loasa flower is most interesting and instructive, and when the cylindrical capsule is ripe, and has burst by its five spirally-twisted valves, the plant again offers a valuable and useful study. The species chiefly cultivated is the *Loa'sa* or *Caioph'ora lateri'tia*, (Bot. Mag. lxv. 3632.) with brick-red flowers, pinnatifid, cut, and serrate leaves, and stems that will twine to the height of 10—20 feet, when under glass. *Loa'sa his'pida*, from the valley of Lima, (lviii. 3057.) has handsome yellow and fragrant flowers, the petals of which are an inch long, and does well in the open garden. *Loa'sa nit'ida*, (l. 3372.) also yellow, is remarkable for the fine gloss of the upper surface of the dark-green leaves. *Loa'sa pic'ta*, (lxxv. 4428.) from the Andes, is white and yellow. *Loa'sa inca'na*, (lviii. 3048.) is wholly white. The genus *Mentze'lia* is also very interesting for the microscope. In *Mentze'lia oligosper'ma* (xlii. 1760.) every part of the plant, except the surface of the petals, is covered with minute white hairs that give it a silky appearance, and which, when magnified, seem as if made of glass, and are found to be covered with little hooks that curve downwards. The leaves are ovate and coarsely serrate; the flowers bright-orange colour and on peduncles shorter than the ovary. *Blumenba'chias*, (lv. 2865; lxiv. 3599.) like the typical genus, are clothed with stings, and distinguished from it by their fruit, which is fleshy, and separates, when ripe, into ten vertical pieces. Another of the species clothed with stings is the *Grono'via* *scan'dens*, the leaves of which are broad and vine-like. In agreeable contrast to these venomous plants we have the showy and stingless genus *Barto'nia.* The common *Barto'nia au'rea* (lxv. 3649.) is one of the handsomest of garden annuals. The stems rise 12—18 inches high, though the branches are more or less procumbent; the alternate and oblong leaves are scabrous, and coarsely toothed or pinnatifid; the peduncles are short and 2—3-flowered; and the five large petals of a brilliant golden yellow, orange at the base, and beautifully striated. Beneath them is the stout and twisted ovary, counterfeiting a hairy peduncle; and within are innumerable stamens, resembling those of the rose-of-Sharon, and disposed in five fasciculi. The flowers only open in sunshine, and are very evanescent. *Barto'nia orna'ta* or *decapet'ala*, (xxxvi. 1487.) from the banks of the Missouri, has white and fragrant flowers three inches across, and in general figure not unlike a white-flowered Cactus. *Microsper'ma* or *Eucni'da bartonioi'des* (lxxvi. 4491.) is also very showy. *Illai'rea canarinoi'des* is a climber with orange and scarlet flowers as large as those of the Cobæa.

CXXXIV. THE PARSLEY FAMILY.—*Umbellif'eræ* or *Apia'ceæ.*

An extensive and very remarkable family, seldom supplying examples of floral beauty, and for the most part weedy and unattractive, but in many cases notorious for deadly virulence; in others esteemed for pleasant taste of root or herbage, or for the aromatic and generous flavour of the seeds. The species, excepting a few suffrutescent forms of remote countries, seldom in cultivation, are universally herbaceous, though some grow to the height of ten or twelve feet. Those of Great Britain are remarkably alike in structure. Pinnatifid leaves, minutely and repeatedly sub-divided, (so as to be popularly confounded with ferns) and compound umbels of numerous small white flowers, are present in all but seven or eight that occur wild. Abroad they are a good deal diversified. Those forms which in Britain are exceptional, often predominate; and organs which in our native kinds are inconspicuous, are often so much enlarged as to become the most striking portion of the plant. In most cases, however, the family is marked beyond possibility of mistake, by the very peculiar condition of the flower and fruit, the latter of which parts is quite unique. The ovary is inferior and 2-celled. The tube of the 5-lobed calyx envelopes and is completely adherent to it, the five free points of the sepals appearing only as minute teeth around the summit, and being sometimes reduced to a mere border or thickened margin. The corolla consists of five small petals, which are often unequal in size, frequently notched or lobed, and often have the point curved inwards. The stamens are invariably five, curved inwards while young, alternate with the petals, and, along with the two distinct styles, inserted upon a 2-lobed and fleshy disk which appears to consist of the dilated bases of the styles, and forms a plate-like crown to the ovary. When ripe, the ovary separates into two indehiscent carpels, each tipped with its withered style. The separation commences at the base, the summits remaining attached for some time to a central, filiform, and generally bipartite axis, which is common to both, and from the prongs of which the carpels become suspended in the very curious and singular manner represented in Fig. 164. The entire fruit is technically termed the "cremocarp;" each of the seed-like halves into which it divides, is termed a "mericarp;" and the central column from which they hang is called the "carpophore." Each of the mericarps has five longitudinal ridges, though sometimes they become very faint, and between these five, there are sometimes four subordinate ridges. The primary ones are in some species dilated into wings; in others the surface is covered with prickles or bristles. Within the coat of each mericarp there are several longitudinal cavities, filled with resinous or oily matter, which is generally coloured. These reservoirs are termed "*vittæ*," and it is their contents that give the peculiar aromatic odour and property to the fruit. The seed itself lies within and is tasteless.

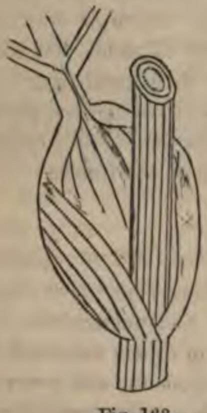

Fig. 163.
Dilated petiole.

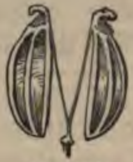

Fig. 164.
Fruit, opened.

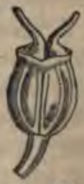

Fig. 165.
Fruit, unopened.

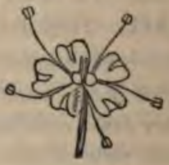

Fig. 166.
Flower (Caraway).

Whatever the foliage or the inflorescence of a plant of this family, there is never any deviation in these particulars unless, perhaps, in *Hydrocot'yle.* As regards the former, they differ, however, very widely,—so widely indeed, that in some of the commonest representatives, the idea of an umbelliferous plant, as derived from the name of the family, is totally lost. It is impossible, accordingly, to give a description that shall include the whole, except in reference to the flowers and fruit, as already done. The great mass of the British and cultivated species do, nevertheless, correspond pretty closely, and no plants are more easily identified than these. Hemlock may be taken as their general type and representative.

In these, or the normal Umbelliferæ, the stems are jointed, furrowed, 1—6 feet high, usually hollow, branched and erect, though a few semi-aquatic kinds are apt to sprawl. The leaves vary from *quasi*-pinnate to doubly and triply pinnatifid, and often have their petioles dilated at the base, the latter part serving, while young, as a cover for the axillary buds. The flowers are borne in compound umbels that vary from 1—12 inches across, and which are either flat or hemispherical, according as the stalks are of equal or different lengths, the general character being that represented in Fig. 167. The smaller divisions are called the "umbellules," and the stalks that support them the "rays." At the base of the rays there are, in many species, several bracts, constituting an "involucrum;" and below every umbellule, there is usually a set of similar but smaller bracts, called the "involucel." When an involucrum is not developed, the umbel is said to be "naked." The white, or occasionally yellow or pinkish petals, are usually unequal, forming a small star of five rays, which is flattish or somewhat concave, and more or less irregular. Those of the flowers at the margin of the umbel are frequently very much larger than the others, giving it a "radiant" appearance, something like that produced in candytuft.

The abnormal species differ from these partly in foliage and habit, partly in the inflorescence. The umbels are occasionally simple, as in *Astran'tia* and *Didis'cus;* the leaves are sometimes intensely prickly, and the flowers consolidated into ovoid heads, as in *Eryn'gium;* in other genera, as *Bupleu'rum*, the leaves are reduced to ovate or lanceolate phyllodia, and the minute and sessile flowers are almost concealed by bracteas. *Trin'ia* is diœcious, and in the *Œnan'thes* and many others the flowers are often unisexual by abortion.

The properties of the Umbelliferæ are of three principal and remarkably different kinds. In one section, a watery and acrid matter is present; in a second, a milky and gum-resinous secretion; and in a third, an aromatic and oily one. When the first of these predominates, they are poisons; the second in excess converts them into stimulants; the third renders them carminative and serviceable as pleasant condiments. If both the acrid and the gum-resinous secretion be absent, they are often useful articles of food, as happens with the sweet roots of the carrot and the parsnip, and the foliage of samphire, fennel, chervil,

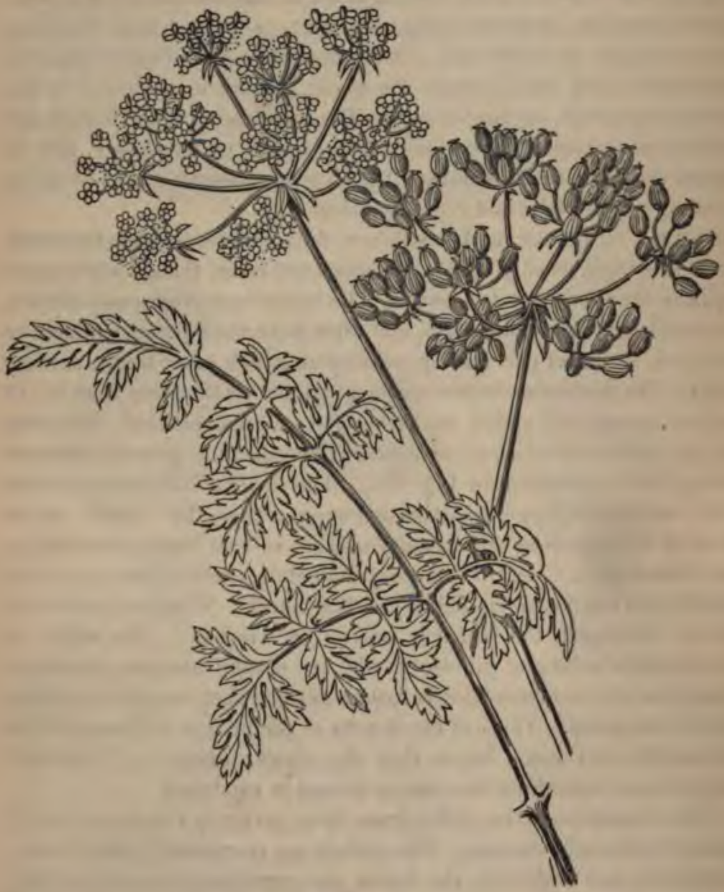

Fig. 167.

True Hemlock *(Coni'um macula'tum).*

parsley, and celery, though the last is only edible when blanched by seclusion from the light. Among the poisons, hemlock or *Coni'um* holds the first place; after this come the fools'-parsley, the cow-bane, and the yellow-juiced drop-wort, all of them exceedingly dangerous. The species that yield gum-resinous matters are the asafœtida plant, the opoponax, the ammoniacum, and several others, well known to druggists and students of *Materia Medica;* to those noted for their carminative properties, we owe caraways, aniseed, coriander, and cummin.

The chief seats of this remarkable family are the northern parts of the northern hemisphere. In tropical countries it is nearly unknown, except at considerable elevations, where the climate is that of temperate latitudes. Fifteen hundred species are estimated as its contents, and of these there occur in Britain, either indigenous, or naturalised, or as colonists, about sixty. Few plants, excepting the abnormal species, are so difficult of discrimination. It is an old botanical axiom, that the easier it is to tell the family a plant belongs to, the harder it is to distinguish the species and the genus; and nowhere does that axiom apply more forcibly than in the case of the normal Umbelliferæ.—The ripe fruit affords the generic characters, and scientific systems of classification always take it as their basis; but what is to be done when our desire is to determine an umbelliferous plant while only in flower? By the time, moreover, that the fruit is ripe, the characters derived from the flowers and foliage are often obliterated, and some species very seldom mature any. Hence it becomes desirable to seek for characters which can be used while the fruit is in preparation, leaving the importance of the latter to be recognised as soon as it is ready. The fruit being obtained, the microscope is indispensable in the examination, since every fruit must be observed in horizontal section as well as externally, so as to obtain a view of the vittæ. The species formerly accounted British, but now usually omitted from catalogues of native plants, are *Echinoph'ora spino'sa*, (E. B. xxxiv. 2413.) *Tordyl'ium officina'le*, (xxxiv. 2440.) *Chærophyl'lum au'reum*, (xxx. 2103.) and *Chærophyl'lum aromat'icum* (Supp. i. 2636.)

In the enumeration that follows, I have adopted, as elsewhere, what I believe to be the best nomenclature, without absolutely following any "authority." The confusion, respecting the genera at least, has until of late been immense, as indicated in the synonymes connected with the citation of coloured drawings of the several species, and for a long time yet there must be difference of opinion.

SECTION I.

ABNORMAL SPECIES *(i.e.* in no respect resembling *Coni'um*, Fig. 167.)

A. *Leaves undivided.*

- Leaves circular, *crenate*, peltate, about an inch in width, and glabrous.—Stems creeping, 3—12 inches long, the leaves rising in clusters from the joints, on erect petioles 2—4 inches in length. Peduncles from the same joints, never so tall as the leaves, and bearing a little head of about five minute and pinkish flowers. 1. MARSH PENNY-WORT.

•• Leaves *quite entire*, and with parallel veins. Flowers yellowish and minute.

† Leaves roundish-ovate, the base growing round the stem in such a way as to render the latter *perfoliate*. Plant 12—18 inches high, branched at the upper part. Bracts of the involucels broadly-ovate, greenish-yellow, bristle-pointed, and three times as long as the inconspicuous flowers. 57. THOROW-WAX.

†† Leaves narrow and grass-like.

a. Perennial. Stem erect and panicled. Radical leaves obovate, 5—7 veined, and petiolate; upper ones linear-lanceolate and sessile. Rays of the umbel 4—8, and longer than the five bracts. 58. PERENNIAL BUPLEURUM.

b. Annuals. Rays of the umbel few and short.

Flowers 2—3 together, in little heads along the slender wiry stems, which are about a foot long, and very much branched. Leaves linear. Bracts very small. 59. SLENDER BUPLEURUM.

Plant 3—4 inches high. Leaves lanceolate, 3-veined, pale and rigid. Rays 3—4. Bracts large, lanceolate, acute, longer than the greenish flowers. 60. SMALL RIGID BUPLEURUM.

B. *Leaves very prickly.* Plant hard, glabrous and very rigid. Flowers in very dense and compact heads, with a scale to every floret. Petals erect, with a long inflected point.

Radical leaves rounded, plaited, the edges very spinous, like holly, and with long petioles; upper ones lobed and amplexicaulent. Plant about a foot high, stout, glaucous, and with a blueish tinge. Flowers blue, the *scales of the florets 3-cleft.* Involucre 3-lobed, longer than the head, and, as well as the leaves, beautifully veined. Roots extending a long way into the sand, and with clammy sap. 4. COMMON ERYNGO.

Leaves pinnatifid and cut, the upper ones stem-clasping. Plant 12—18 inches high, and rather slender. *Scales of the florets undivided.* Flowers purplish or white. 5. FIELD ERYNGO.

C. *Leaves circular in outline, deeply divided, and palmate.*

Flowers in simple umbels, with an erect or spreading involucre of narrow pink or straw-coloured bracts resembling petals, and as long as the peduncles. Lower leaves 5—7-lobed, the lobes acute and serrate.—Plant 1—2 feet high. 3. ASTRANTIA.

(Abnormal species. *Leaves circular in outline, deeply divided, and palmate.*)

Flowers in small heads, without involucres, and collected into small umbellated panicles. Leaves mostly radical, 3—5-lobed and cut, glabrous, bright shining green, finely serrated, and on petioles 3—6 inches long. Flowers sessile on the receptacle; petals pale pink and incurved, stamens one-third of an inch long when fully developed. Fruit ovoid, rough with hooked prickles. Plant 3—18 inches high. 2. Sanicle.

SECTION II.

Umbelliferæ of normal character, but with very striking individuality of feature or figure.

A. *Aquatic or waterside plant, consisting of a series of green tubes;* those of the stem as thick as a quill, the others smaller, and the only parts not tubular being leaves that may be under water. Stem nearly simple, 2—3 feet high. Leaves *quasi*-pinnate, those of the stem few and distant, the leaflets very small, confined to the upper extremity, and hollow like the long petioles. Rays of the umbels few and very short; flowers white; the umbels, when in fruit, nearly globular, and the size of a marble. Root stoloniferous. 24. Tubular Dropwort.

B. *Leaves divided into bristle or hair-like segments.*

* Plant floating in water. Umbels generally of two rays only; umbellules minute, scarcely longer than their involucels. 12. Mudweed (aquatic form).

** Plant growing on land.

a. Leaves resembling dense clusters of dark green and tender bristles, the general outline triangular, and the length 3—6 inches. Bristle-like segments not exceeding an inch, usually less, and projecting in all directions. Stem 12—18 inches high, the base crowded with the withered remains of former leaves. Flowers cream-coloured. Fruit elliptical, with five prominent and equal ribs, and many vittæ between. 29. Spignel.

b. Divisions of the leaves hair-like, flaccid, pendulous, the principal fibres usually several inches in length, and the general outline triangular. Flowers yellow. Plant glabrous, perennial, erect, and branching, 2—3 feet high, and often taller. Rays of umbel 15—20 or more.

Stems rod-like and usually hollow. Leaves numerous, soft, and dark-green. Umbels terminal and rather concave. Flowers deep yellow. Plant with a very strong and peculiar odour. Fruit oblong; the carpels with five prominent ribs, and single vittæ between. 32. Fennel.

Stem striated. Leaves five times tripartite. Umbels large, their rays and those of the umbellules numerous. Plant with a strong sulphureous smell. Fruit flat, with a broad thin border; the carpels with three slight ribs and single vittæ between. 37. Sulphur-weed.

(UMBELLIFERÆ OF NORMAL CHARACTER, &c. *Leaves divided into bristle or hair-like segments.* Plant growing on land.)

c. Leaves chiefly radical, *quasi*-pinnate, narrow, and several inches long; the segments opposite, and cut to the base into linear lobes, so that every pair presents the appearance of a whorl of separate and linear leaflets spreading on all sides from the main stalk. Stem solitary, 12—18 inches high. Umbels few and terminal. Rays 6—8. Flowers white. Fruit oblong; the carpels with five filiform ridges and solitary vittæ between. 17. WHORLED CARUM.

C. *Stem remarkably spotted with blackish-purple, glabrous, polished and shining,* 4—6 feet high, slender, and much and gracefully branched at the upper part. Leaves tripinnatifid, the lower ones often 2 feet long, the segments lanceolate, and the divisions acute and often cut. Rays of the umbel 8—12. Flowers white. Bracts of the involucrum several, short, and ovate-lanceolate; those of the umbellules about three, lanceolate, all upon one side, and shorter than the umbellules. Fruit broadly ovoid; the five ribs prominent, and waved or crenate. Root fusiform. Whole plant smelling nauseously when bruised. 6. TRUE HEMLOCK.

D. *Bracts of the involucrum* very large, nearly as long as the rays of the umbel, and for the most part *deeply-pinnatifid and cut.* Stem 2—3 feet high, branched, rough, and very bristly. Leaves tri-pinnatifid, the segments deeply cut, narrow, and acute. Flowers white, the central blossom of every umbel usually red or dull-purple, and abortive. Rays about 40. Umbel, when in fruit, usually concave, and resembling a little nest. Fruit rough with bristles. 42. WILD CARROT.

E. *Bracts of the umbellules remarkably pendulous,* three in number, longer than the umbellules, and upon their outer side. No general involucrum. Plant 1—2 feet high, branchy, leafy, and dark-green. Leaves triangular in outline, doubly-pinnatifid, glabrous, the segments wedge-shaped and decurrent.—Umbels on long stalks. Rays 5—9. Fruit abundant, ovoid-globular, whitish, with five ribs and solitary vittæ between. 28. FOOLS'-PARSLEY.

F. *Seaside-rocks plant,* very succulent, pale green and glaucous. Leaves bi-ternate and tri-ternate, the segments long, lanceolate, and narrowed at each extremity. Branches diffuse. Flowers yellowish. Rays 8—15. Involucre of about five ovate bracts; involucels of about seven. Fruit elliptical and spongy, the ribs five, and the vittæ numerous. 36. SAMPHIRE.

G. *Ovary and fruit remarkably bristly or prickly.* Rays of the umbels not more than eight, and usually much fewer.

* Umbels terminal, or, if lateral, on peduncles longer than the rays; flowers with a tendency to pink or lilac.

a. Involucre of several bracts, about one to every ray.

Bracts small and subulate. Plant 2—3 feet high, branched, slender and graceful. Stem solid and rough. Leaves bi-pinnatifid, hairy, the segments narrow and sharply cut, the terminal lobe much elongated and often attenuate. Umbels on long peduncles. Rays 7—10. Flowers usually lilac. Bristles of the ovary incurved, and in vertical rows. 50. LILAC HEDGE-PARSLEY.

(UMBELLIFERÆ OF NORMAL CHARACTER, &c. *Ovary and fruit bristly or prickly.* Umbels terminal. Involucre of several bracts.)

Bracts broad, ovate, and membranous. Plant hispid.—Leaves little divided, the segments pinnatifid, serrate, and decurrent. Flowers rose-coloured, large, and handsome. Fruit large and abundantly prickly.
54. BROAD-LEAVED CAUCALIS.

b. Only one bract to the umbel, and very few to the umbellules. Plant 6—18 inches high, much and densely branched. Leaves bi-pinnatifid, rigid, the segments oblong and sharply cut. Umbels stalked. Rays 5—6. Prickles of the fruit spreading, and hooked at the tip.
51. SPREADING HEDGE-PARSLEY.

c. No bracts to the umbel, and very few to the umbellules. Rays 3. Plant somewhat bushy, nearly glabrous; the stem deeply furrowed, and hairy at the joints. Leaves repeatedly divided. Ovary with hooked prickles; each umbellule ripening three fruits or rarely more.
53. SLENDER-LEAVED CAUCALIS.

** Umbels always lateral, opposite the leaves, either sessile, or upon peduncles shorter than the rays.

Umbels contracted into little sessile heads. Stems and branches 12—18 inches long, rough, diffuse, and often prostrate.—Leaves bi-pinnatifid, the segments ovate, cut, and acute. Flowers reddish. Outer fruits of the umbel with hooked prickles, inner ones warty, and all short.
52. KNOTTED BURWEED.

Umbels of 3—4 slender rays, and on short peduncles. Stem glabrous, polished 2—3 feet high. Leaves thrice-pinnatifid, the segments obtuse, delicate green. No general involucre. Bracts of the umbellules 5—6, their edges fringed. Flowers pure-white. Fruit ovoid, conical, and as large as the beak. Sheaths and leaves more or less hairy.
48. BUR-PARSLEY.

H. *Umbels sessile* or very nearly so, and mostly opposite the leaves. Plant glabrous and succulent, more or less procumbent, usually growing by the water-side, and with a strong odour when bruised. Branches 1—2—3 feet long. Flowers white and insignificant. Fruit ovoid, with five ribs and solitary vittæ between.

Lower leaves doubly-pinnatifid; upper ones ternate and very small, the middle lobe on an attenuated stalk; the segments of the whole wedge-shaped, and cut and lobed at the extremity. No bracts either to the umbels or the umbellules, but to the former one or two small ternate leaves instead. Rays 3—6. Carpels with two additional vittæ on the face next the axis. 8. WILD CELERY.

Leaves *quasi*-pinnate, the 7—21 segments ovate, lanceolate, serrate, and very sessile. *Bracts to the umbellules*, and sometimes also to the umbels. Rays 5—7—10. No vittæ on the face of the carpels.
11. COMMON MARSHWORT.

(UMBELLIFERÆ OF NORMAL CHARACTER. &c.)

I. *Leaves tripartite, very large, the segments linear-lanceolate,* 1—2 *inches long, acute, serrated, and decurrent;* lower ones upon long petioles. Stem stout and hollow, 3—4 feet high, and not much branched. Umbels large. Flowers white. Rays 10—20, with only 1—2 bracts, or none. Umbellules with several lanceolate bracts. Calyx-teeth prominent. Carpels nearly globular, the five ribs broad and flat, with single vittæ between. Root fibrous. 7. WATER COWBANE.

J. *Fruit inflated* and nearly globular, *resembling two little smooth bladders,* with a loose seed in each. Stem erect, nearly simple, 1—2 feet high, glabrous, and almost naked. Radical leaves twice or thrice ternate, the segments wedge-shaped, acutely cut or deeply 3-lobed. Stem-leaves few, ternate and entire, the segments linear-lanceolate. Uppermost leaves reduced to sheaths. Umbels terminal. Rays 10—12. Flowers white and rather large. Bracts few and linear. (Cornish plant.) 55. CORNISH BLADDER-SEED.

K. *Roots with numerous tubers, formed by the swelling of the fibres;* the tubers elliptical, oblong, or globular. Leaves twice or thrice pinnatifid, usually large. Flowers whitish and partly sterile. Fruit ovate or elliptical, the carpels corky, with five broad ridges, and solitary vittæ between, and crowned by the persistent styles and calyx-teeth. Plant glabrous.'

Tubers fusiform, clustered about the base of the stem, and not unlike those of the Dahlia. Plant 3—4—5 feet high, stout and branched. Leaves large, glossy, and spreading, the *segments* of those on the stem *numerous, broadly wedge-shaped or oblong,* and variously cut. Umbels on long terminal stalks, with 15—20 rays 2—4 inches in length. Umbellules globular, with numerous narrow bracts. Sap often becoming yellow after exposure for a short time to the air, and becoming dry. 25. YELLOW-JUICED DROPWORT.

Tubers more or less distant from the base of the stem. Segments of the stem-leaves irregularly bifid or trifid, the divisions *few and linear,* and often very long. Plant 2—3 feet high, the branches few, long, and slender. Rays 8—15, and rather short. Umbellules densely crowded. 26. PIMPINEL DROPWORT.

SECTION III.

NORMAL UMBELLIFERÆ WITH THE LEAVES QUASI-PINNATE, OR SIMPLY-PINNATIFID, LONGER THAN BROAD, and without distinct lateral branches; the segments usually serrate, sometimes very deeply divided, and even subdivided.

A. *Insignificant waterside plant.* Stems procumbent, 3—12 inches long; leaflets few and minute, those of the submerged leaves hair-like. Rays of the umbel rarely more than two; flowers minute. 12. MUDWEED.

B. *Flowers yellow or yellowish-green.* Stem 2—4—6 feet high, erect, deeply furrowed, branched, leafy, and rough. Segments of the leaves 3—5—9, ovate and serrated, the terminal one 3-lobed, and the lower ones deeply and irregularly divided, the general surface wavy and uneven. Umbels large and terminal. Rays numerous. No bracts either to the umbels or the umbellules. Fruit oval and flat. Petioles dilated. Plant yellowish. 40. WILD PARSNIP.

(NORMAL UMBELLIFERÆ WITH THE LEAVES QUASI-PINNATE.)

C. *Umbels lateral, usually almost sessile*, their stalks always shorter than the rays. Plant semi-aquatic, branchy and succulent, the branches hollow, and 1—3 feet long. Segments of the leaves ovate-lanceolate, serrated, and very sessile. Rays of the umbel 5—7—10. Flowers white and inconspicuous. Fruit ovoid; carpels with five prominent and equal ridges, and solitary vittæ between. Whole plant glabrous, and when crushed, with the smell of carrots.
11. COMMON MARSHWORT.

D. *Petioles remarkably dilated at the base*, so as to form great pouches, in which the buds are contained while young, and which afterwards become ladle-form. Plant 2—4 feet high, sturdy, coarse, and rough. Leaves very large, the segments 3—5, irregularly cut, and the terminal one 3-lobed. Umbels large, broad, and flat, the outer flowers larger than the inner ones; petals white, sometimes with a lilac or rosy tinge. Fruit abundant, oval, flat, and whitish, with four short purplish-brown and conspicuous vittæ on each side. No involucrum. 31. COMMON COW-PARSNIP.

E. *Leaves chiefly radical*, delicate, narrow, and several inches long; the segments opposite, and *cut to the base into linear lobes*, so that every pair presents the appearance of a whorl of separate and linear leaflets, spreading on all sides from the main stalk. Stem solitary, 12—18 inches high. Umbels few and terminal. Rays 6—8. Flowers white. Fruit oblong; the carpels with five filiform ridges and solitary vittæ between. 17. WHORLED CARUM.

F. *Rays of the umbel not more than* 2—3—4. Flowers white, lilac or pinkish. Plant glabrous, erect, and branchy. Fruit ovoid; carpels with five ribs, and solitary vittæ between.

Segments of the lower leaves an inch or more in length, coarsely and irregularly serrated; upper leaves ternate. Rays of the umbel 3—5, the middle one shorter. Flowers very few. Plant 18—30 inches high, the branches stiff and wiry. Vittæ clavate. Smell strong and disagreeable. 13. COMMON HONEWORT.

Leaves small, resembling the radical ones of the *Pimpinella Saxifraga*, the ovate and serrate segments about half an inch long. Rays 2—3; very irregular. Plant 9—18 inches high. Leaves chiefly radical, and soon withering; upper ones merging into linear bracts.
10. CORN-PARSLEY.

G. *Rays of the umbel numerous.*

- No bracts to the umbels, or only 1—2 very minute ones. Fruit short; the five ribs scarcely prominent, and the vittæ numerous.

Leaves 2—4 inches long, very variable, even upon the same individual. Segments of the lower ones in 4—9 pairs, usually circular or ovate, half an inch to an inch long, and serrated; segments of the upper ones usually very much cut and deeply divided, the uppermost often reduced to narrow bracts. Petioles often several inches long. Stem erect, 1—2 feet high, not much branched. Umbels terminal. Rays 10—16. Flowers white.
20. MEADOW PIMPINEL.

(NORMAL UMBELLIFERÆ WITH THE LEAVES QUASI-PINNATE. *Rays of the umbel numerous,* and without bracts. Fruit short; vittæ numerous.)

Leaves usually 6—8 inches long; the segments ovate, 1½—2 inches in length, deeply and coarsely serrate, and usually of uniform figure upon all parts of the plant. Stem about 2 feet high. Flowers white, sometimes pink. 21. GREAT PIMPINEL.

Segments of all the leaves deeply cut into linear and laciniated lobes, the lowermost lobes of the upper segments crossing one another. Stem 1—2 feet high, branched. Umbels dense. Rays 9—15. Flowers white. Fruit oblong and aromatic. Carpels with five ribs, and single vittæ between. 16. CARAWAY.

** Bracts of the umbels numerous and conspicuous.

† *Stem rough with deflexed bristles,* 3—4 feet high, erect, branched and deeply-furrowed. Leaves covered with bristly hairs, the segments 5—7—9, ovate and serrate. Umbels and their bracteas bristly.—Rays 8—10. Flowers reddish, more or less radiant. Fruits flattened and with five ribs, two of which are close to the thickened and wringled margin. Vittæ 1—3. 41. HARTWORT.

†† *Plant glabrous.* Segments of the leaves undivided, though deeply serrated. Bracts of the umbels often deeply cut.

Umbels mostly lateral. Rays usually 10—15. Stem seldom above 2 feet high; much branched. Segments of the leaves in 6—8—10 pairs, deeply and irregularly serrated. Flowers often with a lilac tinge. 22. NARROW-LEAVED WATER-PARSNIP.

Umbels all terminal. Rays usually 15—20. Stem usually 3—4 feet high, stout and furrowed. Segments of the leaves in 6—10 pairs, regularly serrated, and often 1—4 inches long. Umbels large and flat. 23. BROAD-LEAVED WATER-PARSNIP.

SECTION IV.

NORMAL UMBELLIFERÆ WITH THE LEAVES DIVIDED INTO 3—5—7 BRANCHES, and in general outline (when flattened) mostly triangular; the segments generally very numerous.

A. *Segments of the lower leaves never exceeding nine.* Upper leaves often only ternate.

No bracts either to the umbels or to the umbellules. Stem robust, 2—3 feet high. Segments of the leaves 2—3 inches long, ovate and serrated. Root creeping underground. Rays of the umbel 12—20. Fruit ovoid, the ribs slender; vittæ not present. 15. GOATWEED.

No bracts to the umbels, and only a few slender ones to the umbellules. Stem stout and erect, 2—3 feet high. Segments of the leaves large and broad, often 3—5 inches long, and deeply 3-lobed. Umbels large, flat, and terminal. Rays 40—50. Fruit broad and compressed, with a thin, flat, dilated margin, three dorsal and filiform ridges, and two lateral ones. Vittæ solitary. 39. MASTERWORT.

(NORMAL UMBELLIFERÆ WITH THE LEAVES TRIANGULAR AND DIVIDED.)

Bracts of the umbels 2—6, and those of the umbellules about as many. Stem 18—24 inches high, nearly simple, and tinged with red. Segments of the leaves large, sub-rhomboid and serrated. Rays of umbel about 12. Flowers reddish-white. Anthers red. Fruit ovoid, not compressed, with five prominent and acute ribs, and several vittæ between. 34. SCOTCH LOVAGE.

B. *Lower leaves twice or thrice ternate;* upper ones only ternate; the segments broadly ovate and coarsely toothed, sometimes 3-lobed, and usually 2—3 inches long. Plant stout and erect, 2—4 feet high, nearly glabrous, and *bright yellowish-green.* Stem furrowed. Umbels terminal. Rays 8—12. Flowers greenish-yellow, much crowded in the umbellules. Fruit rather large, nearly black, ovoid, with three prominent ribs and several vittæ between, and attached by the very narrow edge. Petioles broad and flattened. 56. ALEXANDERS.

C. *Petioles immensely dilated at the base,* so as to form a great pouch for the buds, and subsequently ladle-form. Stem stout and branched, every branch bearing a large umbel, the surface furrowed, tinged with purple, and somewhat downy, especially at the upper part. Leaves very large and handsome, spreading horizontally, the segments distinct, 1—2 inches long, ovate and serrate. Umbels convex, 6—9 inches in diameter. Rays 20—40. Flowers white or lilac, sometimes pink. Bracts of the umbellules numerous. Fruit flattened, with three dorsal ribs, and two marginal ones dilated into wings, making four wings in all. 30. ANGELICA.

D. *Plant diœcious.* Root-stock short and thick, and almost woody. Flower-stems annual, 3—12 inches high, branchy, pale glaucous-green, and glabrous. Segments of the leaves numerous, narrow linear, ¼—½ an inch long. Umbels small and numerous, and collected into little panicles. Rays 4—6. Bracts absent, or nearly so. Fruit ovoid. Carpels with five prominent ribs, and single vittæ between. 14. TRINIA.

E. Rays of the umbel only 2—3, and without involucrum. Stems and branches weak and spreading, 4—12 inches long. Leaves finely divided. Bracts of the umbellules large, cleft, upright, white-edged, and overtopping the 6—12 short raylets. Fruit linear, with a smooth beak 1½—2 inches long and resembling the tooth of a comb. Ribs five and obtuse. 43. SHEPHERDS'-NEEDLE.

F. Rays of the umbel 4—6—7—10.

- * Flowers greenish-yellow. Plant 1—3 feet high, slightly branched and glabrous. Segments of the leaves few, opposite, and narrow. Umbels terminal. Rays about seven, of unequal length, and with only 1—2 bracts, or none at all. Umbellules with several narrow bracts. Fruit oblong and 5-ribbed. 35. MEADOW SILAUS.
- ** Flowers white.
  - *a.* Plant, when bruised, yielding an intolerably fœtid odour. Stem 12—18 inches high, erect, branchy, and glabrous. Umbels terminal. Rays 5—8. No general bracts, and only a few to the umbellules. Fruit globular and aromatic, the two carpels not readily separating; the ribs scarcely evident, and no vittæ between. 45. CORIANDER.

(Normal, and with the leaves triangular and divided. *Rays of the umbel* 4—6—10. Flowers white.)

b. Plant with a strong aromatic odour. Leaves large, and divided into innumerable little segments. Stem thick, hollow, succulent, furrowed, 1—3 feet high. Umbels terminal and downy. No involucrum. Bracts of the umbellules about five, pale and fringed. Fruit an inch long, dark brown, sharply ribbed, and aromatic. 44. Sweet Cicely.

c. Plant scentless, or nearly so.

Subterranean base of the stem white, flexuose, and gradually tapering down to the root, which resembles a little potato an inch in diameter. Petioles flexuose below ground. Stem 12—18 inches high, branched at the upper part. Umbels drooping while young. Leaves finely divided. Fruit oblong; the five ribs of the carpels equal and filiform, and with three vittæ; the styles persistent and *erect*. 18. Common Earth-nut.

Like the preceding, but larger in all its parts. Stem 2 feet high. Many bracts to the umbels. Rays 10—14. Vittæ solitary. Styles persistent, elongated, and *reflexed*. 19. Great Earth-nut.

Stem rough, and usually spotted with purple, 18—36 inches high, branched, and swollen beneath the joints. Segments of the leaves deeply lobed and cut, *the lobes short and rather obtuse*. Umbels terminal. Fruit long and glabrous, the five ribs and vittæ conspicuous when dry. 46. Rough Chervil.

Stem hairy below, glabrous above, branched, and 2—3 feet high. Segments of the leaves much cut, *the lobes slender and pointed*, and the surface hairy. Umbels terminal. Fruit long, glabrous, very smooth, and without ribs or vittæ. 49. Cow-parsley.

Stem slender, 1½—2 feet high. Leaves pale yellowish-green and very delicate, the segments finely cut, and with short ovate and obtuse lobes. Umbels mostly lateral and sessile. Umbellules small. Fruit large, perfectly glabrous, linear, and tapering upwards. 47. Garden Chervil.

c. Rays of the umbels usually not less than ten, and for the most part, many more than ten.

a. No bracts to the umbels. Flowers white. Fruit cylindrical; the five ribs obtuse and corky.

* Leaves much divided, the segments small, oblong or wedge-shaped, and entire; when under water, sometimes capillary. Plant glabrous, much-branched, and spreading; the stem very thick below, and everywhere hollow. Umbels on very short peduncles, or in the forks of the branches. Rays 10—15. 27. Fine-leaved Dropwort.

** Segments of the upper leaves few, long, and linear. Stems 2—3 feet high, nearly solid, the branches few, long and slender. Rays 8—15, and rather short. Umbellules densely crowded. Flowers partly sterile, the fertile ones usually sessile, the barren ones with distinct pedicels. 26. Pimpinel Dropwort.

(NORMAL, AND WITH THE LEAVES TRIANGULAR AND DIVIDED.)

b. Flowers yellowish-green, and the whole plant partaking of the same hue. Stem 1—2 feet high. Rays of the umbel 15—20 or more. Plant glabrous, and agreeably flavoured. A few bracts both to the umbels and the umbellules. Fruit small and ovoid; the five ridges filiform, and with solitary vittæ between. 9. GARDEN PARSLEY.

c. Juice milky, drying to a brown resin. Plant 4—5 feet high. Segments of the very much divided leaves linear-lanceolate, and their points hard. Rays of the umbel 20 or more, rough, and with an involucre of many lanceolate bracts. Fruit flat, with a broad thin border. 38. MILK-PARSLEY.

d. Umbels hemispherical. Stem stout, erect, 1—2 feet high, furrowed and slightly branched. Leaves chiefly radical, the segments lanceolate, and very acute. Rays 20—30. Bracts numerous both under the umbels and the umbellules. Flowers white and crowded. Fruit ovoid-oblong, hairy, the styles reflexed upon it, and the five ribs prominent and corky, with single vittæ between. 33. MOUNTAIN SESELI.

HABITATS AND DISTRIBUTION.

1. MARSH PENNYWORT—*Hydrocot'yle vulga'ris.*

Borders of ponds, and in boggy ground, where not occupied by large plants, though often half-concealed among rushes and other swamp-loving vegetation of slender habit. Sometimes on the borders of rivulets. Common all over Britain. Fl. May—August.

Curtis, ii. 383; E. B. xi. 751; Baxter, iii. 168.

This and the *Cotyle'don Umbili'cus* are the only British plants with peltate leaves. In Cheshire, where the plant abounds, the little round plates are called by the country children "Fairies' tables."

The highest authorities in Botany being agreed in placing this plant among the Umbelliferæ, I follow their example. But as Dr. Seeman has shown, it belongs rather to the *Aralia'ceæ.* The carpels of the fruit do not separate from the carpophore, nor are they provided with vittæ, and the æstivation of the corolla is truly valvate, whereas that of nearly all genuine Umbelliferæ (though not of *Didis'cus)* is imbricate.

2. SANICLE—*Sanic'ula Europæ'a.*

Woods and groves; common all over Britain. Fl. May, June.

E. B. ii. 98; Baxter, iii. 235.

A plant of a peculiar and very beautiful shade of green. The flowers, when fully blown, reward minute examination with the aid of a lens.

3. ASTRANTIA—*Astran'tia ma'jor.*

A very pretty and favourite garden plant, from central and southern Europe, here and there naturalised in woods upon hills. "Between Whitbourne and Malvern. Above Stokesay Castle, near Ludlow." Fl. June—August.

4. COMMON ERYNGO—*Eryn'gium marit'imum.*

Sandy sea-shores; common upon all the coasts of Great Britain, except those perhaps of the east of Scotland, and extending as far north as the Shetland Isles. Fl. July, August.

Curtis, iv. 597; E. B. x. 718; Baxter, iii. 162.

The most curious and interesting plant of the British coasts, and of remarkable beauty in its bright blue flowers, and blue-tinged and veiny leaves. At St. Helen's, in the Isle of Wight, there grows a variety in which the stems, leaves, and flowers are all rose-coloured.

5. FIELD ERYNGO—*Eryn'gium campes'tre.*

Waste dry places, principally near the sea; extremely rare. Devonport. Gateshead. Weston-super-Mare. Fl. July, August.

E. B. i. 57.

6. TRUE HEMLOCK—*Coni'um macula'tum.*

Damp hedgebanks, ditchbanks, moist waysides, in churchyards, and upon shaded ruins. Generally distributed, but not very common. Burton, near Gresford, abundant. Fl. June, July. Biennial.

Curtis, i. 17; E. B. xvii. 1191; Baxter, iv. 303.

The whole plant is poisonous, but modern experience has shown it to be less violent than was supposed when the juice was given to Socrates. It is both curious and interesting to note how frequently this plant is found, like henbane and the deadly-nightshade, in connection with middle-age ruins. In the court-yard of Tantallan Castle, for instance, that famous stronghold of the once powerful and haughty Douglas family, overlooking the German Ocean, near Berwick, and celebrated in "Marmion." Here it flourishes in the highest luxuriance, forming, in fine seasons, a tall forest.

Popularly the name "hemlock" is applied to many of the Umbelliferæ,—perhaps to all the larger and branching kinds with white flowers. It is well, accordingly, to distinguish the *Coni'um* as the "True hemlock." *Coni'um* is the only British Umbellate in which purple spots and a perfectly glabrous stem are found in company.

7. WATER COWBANE—*Cicu'ta viro'sa.*

Ditchbanks, edges of ponds, and along the margins of rivers; rather rare, though found in most parts of Great Britain and Ireland. Fl. July, August.

E. B. vii. 479; Baxter, v. 395.

One of the rankest of our vegetable poisons.

8. WILD CELERY—*A'pium grave'olens.*

Ditches, marshy places, and especially on the banks of tidal rivers, and in marshes near the sea. Common, as far as the south of Scotland. Fl. July, August. Biennial.

E. B. xvii. 1210; Baxter, ii. 156.

The origin of the celery cultivated in gardens as a vegetable.

9. GARDEN PARSLEY—*Petroseli'num sati'vum.*

Parsley is a native originally of Greece and Asia Minor. Cultivated for its pleasant flavour, from the remotest ages, it has now, like many other old garden vegetables, become naturalised, especially upon rocks near the sea. Isle of Wight, very abundant. St. Vincent's Rocks, near Bristol. Fl. July, August.

E. B. Supp. ii. 2793.

10. CORN-PARSLEY—*Petroseli'num se'getum.*

Moist fields and in hedges where the soil is calcareous, and principally near the sea. Rare, and only found in the southern and midland counties of England. Fl. August. Annual and biennial.

E. B. iv. 228 (as *Si'son se'getum*); Baxter, v. 360.

11. COMMON MARSHWORT—*Helosciá'dium nodiflo'rum.*

Pondsides, and in wet ditches, which it often nearly chokes up; common and abundant everywhere, excepting in the north of Scotland. Fl. July, August.

E. B. ix. 639 (as *Si'um nodiflo'rum*); Baxter, vi. 415.

Si'um re'pens of E. B. xx. 1431 is a variety of this plant, with rounder and more acutely-serrate leaflets, a longer-enduring involucrum of more numerous bracteas, and yellow anthers instead of purple ones.

12. MUDWEED—*Helosciá'dium inunda'tum.*

Swamps and muddy borders of ponds; sometimes floating in the water. Common everywhere. Fl. May—July. Annual?

E. B. iv. 227 (as *Si'son inunda'tum*).

When floating in water, the submerged leaves are attenuated to the fineness of hair.

13. COMMON HONEWORT—*Si'son Amo'mum.*

Moist fields where the soil is calcareous. In the south of England frequent; in the north rather scarce, and in Ireland not found. Horfield, near Bristol. Fl. July, August. Annual or biennial.

E. B. xiv. 954; Baxter, vi. 407.

14. TRINIA—*Trin'ia glaber'rima.*

Among the short turf upon dry and sunny limestone rocks, and in dry fields on calcareous soil; extremely rare. St. Vincent's Rocks. Berryhead, Devonshire. Uphill and Weston, Somersetshire. County Meath, Ireland. In Scotland not found. Fl. May, June.

E. B. xvii. 1209 (as *Pimpinel'la dioi'ca*); Baxter, vi. 468.

15. GOATWEED—*Ægopo'dium Podagra'ria.*

Damp waysides, borders of rivers, orchards, and in waste places, especially near towns; common everywhere. Fl. May, June.

E. B. xiv. 940; Baxter, ii. 151.

16. CARAWAY—*Ca'rum Ca'rui.*

Occasionally in cultivated fields, from seeds undesignedly conveyed thither, having been an inhabitant of English gardens for many centuries. Fl. June. Biennial.

E. B. xxi. 1503; Baxter, iii. 232.

17. WHORLED CARUM—*Ca'rum verticilla'tum.*

Heathy and boggy places, and low wet meadows; chiefly in Wales, the west of Scotland, where it is plentiful, and in Ireland. Abundant between Llanberris and Bethgellert, about Dunoon, near Swansea, and near Lancaster. Fl. July, August.

E. B. vi. 395 (as *Si'son verticilla'tum.)*

18. COMMON EARTH-NUT—*Bu'nium flexuo'sum.*

Dry woods, orchards, hill-sides, rough steep slopes under trees, hedgebanks, and meadows; abundant everywhere. Fl. May, June.

Curtis, ii. 241 (as *Bu'nium Bulbocas'tanum)*; E. B. xiv. 988; Baxter, vi. 435.

The most delicate of the British Umbelliferæ, both in branch and leaf, and easily distinguished by the bendings of the stem just below the surface of the ground, where it looks as if it had been turned out of its course by little stones, and at this part decreases in size *downwards.* The round chesnut-like roots are good to eat, but they lie deep, and are very slenderly attached, so that great care is required in digging them up. The light and pretty foliage makes its appearance very early in the spring, and mingles with the foremost woodland flowers.

19. GREAT EARTH-NUT—*Bu'nium Bulbocas'tanum.*

Chalky fields in Cambridgeshire and Hertfordshire. Fl. July, Aug.

E. B. Supp. iii. 2862.

By some referred to the genus *Ca'rum,* on account of the resemblance as to fruit. But in every other particular the plant is a *Bu'nium,* furnishing a notable instance of likeness in all obvious characters, yet of discrepancy in what are usually the essential ones, and such as are depended on for generic distinctions.

20. MEADOW PIMPINEL—*Pimpinel'la Saxif'raga.*

Dry meadows and pastures: common everywhere. Fl. July, August.

E. B. vi. 407; Baxter, vi. 411.

Remarkable for the diversity of its slender and pretty leaves.

21. GREAT PIMPINEL—*Pimpinel'la mag'na.*

Dry shady hedgebanks, and upon hills, under the shelter of trees; also on limestone cliffs. Not very common, and chiefly in the south and east. In Scotland rare. Ashbrook Dale, Buxton, very abundant. Fl. July, August.

E. B. vi. 408.

Occasionally with the flowers pink, as upon the Alps.

22. NARROW-LEAVED WATER-PARSNIP—*Si'um angustifo'lium.*

Ditches and pondsides; common, except towards the north. Fl. July, August.

Curtis, iii. 468; E. B. ii. 139.

23. BROAD-LEAVED WATER-PARSNIP—*Si'um latifo'lium.*

Banks of rivers and ditches, fens, borders of marshes, &c.; rather rare, though found in Scotland and Ireland as well as England. Fl. July, August.

Curtis, iii. 469; E. B. iii. 204; Baxter, iv. 319.

24. TUBULAR DROPWORT—*Œnan'the fistulo'sa.*

Ditches, pondsides, and similar watery places; common, except in Scotland. Fl. July, August.

E. B. vi. 363.

When quite in the water, the roots are wholly fibrous; in moist soil the plant becomes more or less stoloniferous; in situations comparatively dry, the roots often distend into tubers like those of the other Œnanthes, especially if the season be drouthy.

25. YELLOW-JUICED DROPWORT—*Œnan'the croca'ta.*

Watery places, ditchbanks, and river sides; common, except in Scotland. Southern counties of Ireland, very abundant. Fl. July.

Curtis, iv. 599; E. B. xxxiii. 2313; Baxter, ii. 160.

A very poisonous plant, especially to mares and cows. It differs, however, considerably, in degree of virulence, the roots, at all events, being in some localities apparently innocuous. Peculiarities of soil and climate appear to modify the properties of plants reputed poisonous, to a very remarkable extent,—a circumstance that has been noticed not only in the Umbelliferæ. The most virulent individuals of the *croca'ta* are probably those in which the bright-yellow juice, from which it was named, flows the moment the stem is broken. In many individuals, sometimes in entire districts, the fresh juice is colourless, though acquiring more or less of a yellow tint after the absorption of oxygen.

26. PIMPINEL DROPWORT—*Œnan'the pimpinelloi'des.*

Meadows and pastures, both dry and moist, and in marshes, both fresh-water and salt; generally diffused, but in many parts uncommon. Fl. May.

The form of the tubers and of the radical leaves both vary considerably with change of habitat. Hence this plant is by some authors broken up into three and even four species, namely:—

Œnan'the pimpinelloi'des as named by Linnæus—"Root of long fibres bearing spherical or oval knobs beyond their middle. Segments of the radical leaves wedge-shaped and cloven. Partial umbels close together, forming one compact, flat-topped, compound umbel. Fruit sub-cylindrical, with an enlarged corky base. Southern counties of England."

Œnan'the Lachena'lii—"Root of long sub-clavate fleshy fibres, tapering at both ends. Segments of the radical leaves as in the preceding. Umbellules distinct and spherical. Fruit oblong, narrowed below. Marshes, common. E. B. v. 347 (as *Œ. pimpinelloi'des*)."

Œnan'the Smith'ii—"Root of elliptic-oblong and sessile knobs. Segments of the leaves all linear. Fresh-water marshes in England. E. B. v. 348 (as *Œ. peucedanifo'lia*)." Probably the same as "*Œnan'the silaifo'lia.*"

27. Fine-leaved Dropwort—*Œnan'the Phellan'drium.*

Ditches and pondsides, not uncommon, except in Scotland, where it is very rare. Cheshire, plentiful. Fl. July—September. Biennial?

E. B. x. 684 (as *Phellan'drium aquat'icum).*

The *Œnan'the fluviat'ilis* of E. B. Supp. iv. 2944 appears to be a form of this plant corresponding to the aquatic state of the *Heloscia'dium inunda'tum.* When growing in deep and running water, the stems naturally become much elongated, and the lobes of the leaves almost hair-like. It ripens little or no fruit, increasing much by viviparous buds, and roots copiously from the joints. Plentiful in the Itchen at Winchester, and in Whittlesea Dykes, Northamptonshire, where it grows to a large size and thrives prodigiously.

28. Fools'-parsley—*Æthu'sa Cyna'pium.*

Cornfields, waste ground, and neglected kitchen-gardens, unhappily abundant everywhere, except in the north of Scotland. Fl. July—October. Annual and biennial.

Curtis, i. 18; E. B. xvii. 1192; Baxter, i. 19.

A poisonous plant, which has caused the deaths of many, through its resemblance to genuine parsley. When in flower it is distinguishable by the three long, pendulous bracts beneath the umbellules; when in fruit, by the abundance of its globular and whitish cremocarps; and at other times, by the much more attenuated and never crisped or "curled" leaves, which are also of a dark and unpleasant green, while those of genuine parsley have a yellowish tinge; moreover, when bruised, it yields a strong and virulent smell, something like that of garlic. If the curled varieties of parsley were alone to be cultivated, the fools'-parsley could never be confounded with it by dealers and eaters. In case of an accident with it, the best application is probably that recommended by Professor Christison, namely, milk, mustard poultices on the legs, and cold sponging with vinegar.

29. Spignel—*Me'um Athaman'ticum.*

Dry moors and mountainous pastures. Highlands of Scotland, plentiful. In Ireland not found. Fl. May—July.

Curtis, iv. 600; E. B. xxxii. 2249; Baxter, iv. 314.

Occasionally in gardens.

30. Angelica—*Angel'ica sylves'tris.*

Ditchbanks, borders of rivulets, and marshy places, abundant everywhere. Fl. July—October.

E. B. xvi. 1128; Baxter, vi. 491.

A handsome though not very tall plant, conspicuous in low wet grounds, and on the borders of streams towards the close of the season, when its splendid convex and lilac-tinged umbels rise above the exhausted relics of the summer, and catch the eye at a long distance.

The garden angelica, *(Angel'ica Archangel'ica* of E. B. xxxvi. 2561.) formerly much cultivated for its roots, which were made into a sweet conserve, is a native of northern and eastern Europe, and occasionally appears half-wild. It is similar to the *sylves'tris* in general figure, but immensely larger, and the terminal segments of the leaves are 3-lobed.

31. COMMON COW-PARSNIP—*Herac'leum Sphondyl'ium.*

Dry borders of fields, and frequently among mowing-grass; extremely common everywhere. Fl. June, July. Biennial.

E. B. xiv. 939; Baxter, ii. 130.

One of the noblest and handsomest of our Umbelliferæ, both in the amplitude of its foliage, and the large flat-topped umbels that surmount it. The flowers are pure white (though they have occasionally been found red) and the marginal ones usually larger than the inner, giving the umbel that peculiarly elegant and radiant aspect which we see in the corymbs of the wild Guelder-rose. The fruit ripens abundantly, and furnishes a fine example of the "cremocarp." States of the plant with the leaves deeply pinnatifid, and the lobes very narrow, have by some botanists been catalogued under the name of *Herac'leum angustifo'lium.* Cattle eat the herbage as part of their pasture, and it is probably a wholesome and nourishing food for them.

32. FENNEL—*Fœnic'ulum vulga're.*

Dry waste ground where the soil is calcareous, hedgebanks, and cliffs by the sea; very common, except in Scotland, yet in some localities probably only naturalised, having been in kitchen-gardens from time immemorial. Fl. July, August. Biennial.

E. B. xvii. 1208 (as *Ane'thum Fœnic'ulum*); Baxter, iii. 176.

33. MOUNTAIN SESELI—*Se'seli Libano'tis.*

Dry fields upon calcareous soil; very rare, and only found in Cambridgeshire, Hertfordshire, and Sussex. Fl. July, August.

E. B. ii. 138 (as *Athaman'ta Libano'tis*); Baxter, vi. 455.

34. SCOTCH LOVAGE—*Ligus'ticum Scot'icum.*

Rocky sea-coasts of Scotland, abundant; more sparingly upon those of the north of England and the north of Ireland. Arran. St. Kilda, in north latitude 58°. Fl. July.

E. B. xvii. 1207; Baxter, vi. 472.

35. MEADOW SILAUS—*Sila'us praten'sis.*

Moist meadows and pastures, chiefly upon limestone. In England common; in Ireland and Scotland rather rare. Fl. June—September.

E. B. xxx. 2142 (as *Peuced'anum Sila'us*); Baxter, vi. 404.

36. SAMPHIRE—*Crith'mum marit'imum.*

Rocks and cliffs upon the sea-shore. Common in the south and west of England, and in southern Ireland; elsewhere rather rare. Ormeshead, North Wales. Fl. May—July.

E. B. xii. 819; Baxter, iv. 267.

37. SULPHUR-WEED—*Peuced'anum officina'le.*

Salt-marshes in Kent and Essex are the only British localities. Fl. July—September.

E. B. xxv. 1767.

38. Milk-parsley—*Peuced'anum palus'tre.*

Wet and marshy meadows and alder-swamps; very rare, and apparently confined to the eastern parts of England. Fl. July. Biennial.

E. B. iv. 229 (as *Seli'num palus'tre);* Baxter vi. 419.

39. Masterwort—*Peuced'anum Ostru'thium.*

Moist meadows; a plant naturalised from ancient cultivation as a garden vegetable; rare, and seemingly confined to the north.—Banks of the Clyde. Perhaps truly wild on the borders of Thirlmere. Fl. June.

E. B. xx. 1380; Baxter, v. 370 (both as *Imperato'ria Ostru'thium.)*

40. Wild Parsnip—*Pastina'ca sati'va.*

Dry borders of fields and waysides, chiefly upon limestone and near the sea. Common in England and Ireland, but in Scotland not found. Fl. July, August. Biennial.

E. B. viii. 556; Baxter, iii. 172.

41. Hartwort—*Tordyl'ium max'imum.*

Dry banks and waste ground in Middlesex and Surrey; the only British localities. Fl. June, July. Annual.

Curtis, iv. 598; E. B. xvii. 1173; Baxter, vi. 443.

42. Wild Carrot—*Dau'cus Caro'ta.*

Dry borders of cultivated fields, and on dry waste ground, especially upon gravel, and near the sea; common everywhere. Fl. July. Biennial.

E. B. xvii. 1174; Baxter, iii. 180.

A tough-stemmed, bristly plant, interesting as the probable origin of our garden carrots, though the plant as we have it wild in Britain may probably be a degenerate form of a superior one developed many ages ago upon the Continent, out of the corresponding wild form in which it there also exists plentifully, and long since imported to this country as an exotic esculent. In that case our wild carrot would illustrate the capacity for relapse in plants which quite as certainly exists as the capacity for improvement. It is immediately distinguished by the large pinnatifid bracts of the involucrum; by the central flower of every umbel being usually red or dull purple instead of white, and abortive; and by the umbel becoming concave as the seeds ripen, and, when mature, resembling a little bird's-nest. In autumn the leaves turn purple. On the downs above Alum Bay, Isle of Wight, (remarkable for their diminutive vegetation) it grows only half-an-inch high, yet bears an umbel of flowers, and ripens fruit.

The *Dau'cus marit'imus* of E. B. xxxvi. 2560 appears to be a variety with shorter segments to the leaves, umbels disposed to be flat or even convex when ripe, less prominent prickles upon the fruit, more succulent in herbage, and of smaller stature. Changes such as these, and especially an obese condition, are very commonly induced by the sea-air. Plentiful at the Lizard and on the coast of Hampshire, &c.

43. SHEPHERDS'-NEEDLE—*Scan'dix Pecten-Ve'neris.*

Corn and clover fields; common, except in the northern parts of Scotland. Fl. June, July. Annual.

Curtis, ii. 313; E. B. xx. 1397; Baxter, iv. 272.

The fruit, when fully developed, is nearly two inches long, slender, and in figure not unlike that of a geranium.

44. SWEET CICELY—*Myr'rhis odora'ta.*

Meadows, chiefly by the side of streams and rivers, and often in half-dry water-courses, such as the butterbur inhabits. Common, but principally in the north of England, and in some districts, as near Bristol, unknown. Very abundant in certain localities near Manchester. Fl. May, June.

E. B. x. 697 (as *Scan'dix odora'ta)*; Baxter, v. 374.

Sweet Cicely is one of the first of the Umbelliferæ to open its flowers, though they are often sorely nipped by the east wind. The pure white umbels are at first almost concealed in the great tufts of delicate and yellowish-green foliage; afterwards they become more elevated, and are conspicuous from a long distance. The odour of the plant resembles that of aniseed; the brown fruits are an inch long and deeply furrowed.

45. CORIANDER—*Corian'drum sati'vum.*

Waste ground near gardens, heaps of manure, and in cultivated fields; like the caraway, an occasional visitant, and nowhere really indigenous. Fl. June. Annual.

E. B. i. 67; Baxter, vi. 504.

Well marked by its globular and aromatic fruit, and by the abominably nauseous odour of the foliage when bruised.

46. ROUGH CHERVIL—*Chærophyl'lum temulen'tum.*

Hedgebanks, waysides, and by ditches; everywhere, except in the remote parts of Scotland. Fl. June, July. Biennial.

Curtis, ii. 388; E. B. xxii. 1521; Baxter, vi. 483.

Often conspicuous in the autumn, through the rich purple hue then assumed by the finely-divided and hairy leaves.

47. GARDEN CHERVIL—*Chærophyl'lum sati'vum.*

Waste places; always a descendant of or an escape from cultivation, having formerly been valued as a potherb. Originally from south-eastern Europe. Fl. June. Annual.

E. B. xviii. 1268 (as *Scan'dix Cerefo'lium.)*

48. BUR-PARSLEY—*Anthris'cus vulga'ris.*

Hedgebanks and waysides, chiefly near towns and villages; common, except in Scotland. Fl. May, June. Annual.

Curtis, i. 19; E. B. xii. 818 (both as *Scan'dix Anthris'cus.)*

49. COW-PARSLEY—*Anthris'cus sylves'tris.*

Borders of fields, meadows, and hedges; very common everywhere, and one of the earliest of the family to come in bloom. Fl. April—June.

Curtis, ii. 242; E. B. xi. 752 (both as *Chærophyl'lum sylves'tre)*; Baxter, iii. 228.

50. LILAC HEDGE-PARSLEY—*Tor'ilis Anthris'cus.*

Hedgebanks and dry waysides; everywhere. Fl. July—Oct. Annual.

Curtis, ii. 386; E. B. xiv. 987 (both as *Cau'calis Anthris'cus)*; Baxter, v. 347.

A pretty ornament of the hedgebanks in late summer and autumn, when its simple lilac blossoms come out plentifully. The full-grown but unripe fruit, plentiful in September, is a most beautiful object for the microscope, being of a lively green, and thickly strewed with curving crimson bristles that are speckled with white. At the summit are seen the two crimson and reflexed styles.

51. SPREADING HEDGE-PARSLEY—*Tor'ilis infes'ta.*

Dry banks and cornfields; chiefly in the southern and eastern parts of England, and in Scotland not found. Fl. June, July. Annual.

Curtis, ii. 387 (as *Cau'calis infes'ta)*; E. B. xix. 1314.

52. KNOTTED BURWEED—*Tor'ilis nodo'sa.*

Dry waste places and roadsides. In the south of England common; elsewhere rather rare. Fl. May—July. Annual.

E. B. iii. 199 (as *Cau'calis nodo'sa.)*

53. SLENDER-LEAVED CAUCALIS—*Cau'calis daucoi'des.*

Cornfields, where the soil is chalky; very rare, not native in either Scotland or Ireland, and seldom found except in Oxford and Cambridgeshire. Probably introduced with seed-corn from the continent. Fl. June. Annual.

E. B. iii. 197; Baxter, vi. 459.

54. BROAD-LEAVED CAUCALIS—*Cau'calis latifo'lia.*

Dry fields upon chalky soil; no doubt an importation from the continent. Very rare, and only found in the south and east of England. Fl. July. Annual.

E. B. iii. 198.

55. CORNISH BLADDER-SEED—*Physosper'mum Cornubien'se.*

Dry fields, chiefly among bushes and about hedges, in Cornwall and Devon. Plentiful about Bodmin. Fl. July, August.

E. B. x. 683 (as *Ligus'ticum Cornubien'se)*; Baxter, vi. 475.

56. ALEXANDERS—*Smyr'nium Olusa'trum.*

Dry waste places, limestone cliffs, about ruins, sites of old gardens near ancient buildings, and on bush-covered rocks near the sea; not uncommon, though in many cases probably of exotic origin, being an old-fashioned culinary vegetable. Clevedon, Somersetshire. Carisbrook Castle, very abundant. Fl. May, June. Biennial.

E. B. iv. 230; Baxter, iii. 195.

57. THOROW-WAX—*Bupleu'rum rotundifo'lium.*

Cornfields upon calcareous soil, but only in England, and there a rather uncommon plant of the south, though formerly plentiful. Fl. July. Annual.

E. B. ii. 99; Baxter, i. 13.

One of the most curious and interesting plants our country produces, and very early observed by the fathers of botany, as attested in its old English name, which refers to the apparent "waxing" or growing of the stem "thorough" the leaf. The leaves however, so called, are in this genus probably phyllodia or dilated petioles only.

58. PERENNIAL BUPLEURUM—*Bupleu'rum falca'tum.*

Norton-heath, near Ongar, Essex, the only locality in Britain. Fl. Aug.

E. B. Supp. ii. 2763.

59. SLENDER BUPLEURUM—*Bupleu'rum tenuis'simum.*

Banks of tidal rivers, in the mud, and in salt marshes. Occasionally in moist waste places somewhat inland. Rare, and not found either in Scotland or Ireland. Coast of Hampshire, &c. Shirehampton, on the banks of the Avon, below Bristol. Fl. August, September. Annual.

E. B. vii. 478.

The noticeable *inland* localities are those in the valley of the Severn, as near Malvern, Worcester, and Droitwich. Many other seaside plants are found hereabouts, as *Glaux marit'ima, Planta'go marit'ima,* and *Trit'icum jun'ceum,* all perhaps the relics of an extremely ancient littoral flora, dating back to the time when a salt-water estuary separated England from Wales, and Craig Breiddin was an islet. The Droitwich salt-works can scarcely be supposed to have originated the plants, though it is probably by their copious diffusion of saline material that these memorials of the ancient flora are sustained.

60. SMALL RIGID BUPLEURUM—*Bupleu'rum arista'tum.*

Rocks at Torquay. Dry waste places at Eastbourne, Sussex. Channel Islands. Fl. July. Annual.

E. B. xxxv. 2468 (as *Bupleu'rum Odonti'tes.*)

No family of similar extent to the Umbelliferæ meets with so little recognition in the flower-garden. Its value is displayed rather in the *culinarium,* and in the broad acres that supply the dinner-table; carrots and parsnips, celery, parsley, and fennel, as above seen, being members of it, along with many other succulent vegetables of good flavour, the use of which is now obsolete or nearly so, and all of which have been specified above. There are, nevertheless, a few very ornamental species, especially for the foreground of shrubberies. Such are the exotic Eryngos, especially the *Eryn'gium alpi'num,* prickly in every part, like the indigenous species, and with fine blueish-purple heads surrounded by a great cup-like involucrum. Several *Astran'tias* are also met with, known immediately by their palmate and lobed leaves, and simple umbels of flowers surrounded with pinkish or white bracts an inch or more in length and resembling petals. *Astran'tia* *max'ima* (Bot. Mag. xxxviii. 1553.) is very similar to the indigenous *A. major* (p. 539.) From the northern shores of the Mediterranean we have the *Bupleu'rum frutico'sum*, an erect, half-shrubby, and hardy evergreen, with lanceolate, leathery and sea-green leaves, and terminal umbels of bright yellow flowers which appear in late summer. Attaining the height of 3—6 feet, this plant mingles excellently with large perennials. *Didis'cus cœru'leus*, by some called *Trachyme'ne cœru'lea*, is a lovely annual from New Holland. The hairy stems grow 12—18 inches high; the leaves resemble those of the meadow-buttercup; and the branches terminate in simple umbels, 2—3 inches across, of very numerous bright blue flowers, the peduncles of which are 1—2 inches long, and eventually reflexed. The *bonâ fide* garden Umbellifer is that prodigious plant, the Siberian Cow-parsnip, the largest discovered species of the family. In general figure, foliage, umbels, flowers, and fruit, it resembles the common cow-parsnip of the fields. But every portion, except the actual blossom and fruit, is enormously increased in dimensions, the main stem rising 8—10—15 feet high, or even more, and the terminal umbels measuring a yard and a half across. This great stature it attains in the course of 2—3 months, commencing in April, and completing it by July. For small and well-occupied gardens of course this huge vegetable is unfit, but in wildernesses, edges of plantations, and in public parks, &c., it is well-placed, unless it be an objection that the umbels and upper part of the plant generally, when in bloom, are apt to be infested with prolific and sticky insects. Two species are distinguished, the *Herac'leum gigan'teum*, a biennial, with the umbels somewhat convex; and the *Herac'leum Sibir'icum*, which is perennial, and has the umbels flat-topped. *Arraca'cha esculen'ta*, (lviii. 3092.) also truly umbelliferous, and the tuberous roots of which supply the place of potatoes in Santa Fè, Bogota, and other States of temperate South America, is occasionally grown as a curiosity. For the same purpose also, *Fer'ula Per'sica*, (xlvi. 2096.) the yellow and fragrant *Se'seli divarica'tum*, (xlii. 1742.) and the *Se'seli dichot'omum* (xlvi. 2073.) Rare plants of the family, singular alike in beauty and structure, are sometimes seen in *Xantho'sia rotundifo'lia*, from Port Jackson; *Don'dia Epipac'tis*, from the Alps, with yellow flowers and large bracts like a circle of petals; and *Actino'tus Helian'thi* or *Erioca'lia ma'jor*, from New Holland. Two or three pretty little species of *Hydrocot'yle* are found also in Botanic Gardens, as *saniculæfo'lia* and *sibthorpioi'des*.

CXXXV. THE IVY FAMILY.—*Aralia'ceæ.*

To ordinary out-of-door botany the Ivy-family is barely known, except in the evergreen climber which gives name to it, and in a tiny spring blossom of the hedgebanks, as little like ivy in general figure as could well be conceived. The species, which amount to about 150, are distributed almost all over the world, both in hot countries and cold ones, and in the foliage of their larger forms are very generally ornamental; though the flowers, which are frequently green, make little show except when abundant. In technical characters, the family approaches the Umbelliferæ, differing in the circumstances of the ovary having more than two cells; in the æstivation of the corolla, which is usually valvate; in the strong tendency to form a woody stem; and in the fruit. The flowers are regular; the stamens are as many or twice as many as the petals, which are usually five, sometimes four or six, and occasionally absent. Except in their inferior ovary, these plants bear considerable resemblance also to those of the Grape-vine family; theoretically it may be well to consider them as Vitaceæ with epigynous flowers.

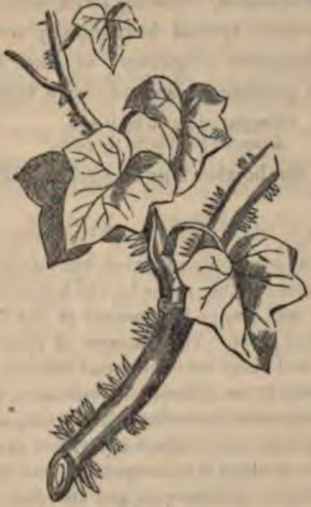

Fig. 168.
Stem, leaves, and holdfasts of Ivy.

Two species British.

1. An evergreen shrub, with numerous slender and flexible branches that put out root-like holdfasts, plentifully clothed with shining foliage, and yielding, when bruised, a strong and peculiar smell. Leaves leathery, entire, petiolate, and either 3—5-lobed or ovate. Flowers in nearly globular umbels, borne in short racemes; petals five, broad and short, and seated, with the five stamens, on a large round ovary, which becomes a smooth black berry, containing 2—5 seeds. COMMON IVY.
2. A delicate herbaceous plant. Radical leaves on long petioles, twice or thrice ternate, with broad, deeply 3-lobed segments; upper leaves only two, on short stalks, and simply ternate. Stem solitary, 3—5 inches high, with five little green flowers in a terminal head, one looking up to the zenith, and the others placed back to back and directed to the four points of the compass. Terminal flower with a 4-cleft corolla and eight stamens; lateral flowers 5-cleft and with ten stamens. Fruit (very rare) a 4-celled green berry. Root-stock covered with imbricated white scales, the remains of old leaf-stalks. MUSK-ROOT.

HABITATS AND DISTRIBUTION.

1. COMMON IVY—*He'dera He'lix.*

Common everywhere; creeping on the ground in woods and upon hedgebanks; while young, running up the stems of trees, and when older, and firmly established, forming large bushes in the upper portion, and if the boughs spread horizontally over banks of rivers, sitting upon them, balanced elegantly; at other times mantling rocks and buildings with a permanent and adhesive tapestry.

> "Creeping where no life is seen,
> A rare old plant is the ivy green."

Fl. late in autumn; the berries ripe in spring, when they are common in rustic posies.

Curtis, i. 16; E. B. xviii. 1267; Baxter, i. 32.

Ivy is not a parasite, as commonly supposed, but has its roots in the earth, and simply adheres to the trees or other props by which it is elevated into the air. If the thick stems which may always be observed at the base, be cut through, it usually dies like any other plant. The diameter of these stems near the ground is often 10—12 inches, and many are often found standing side by side. The age attained by ivy is probably to be reckoned by centuries, for though often found trailing weakly upon the ground, bordering sylvan walks, and entangled in hedges, its true place is the time-worn and roofless abbey, and the crumbling middle-age castle, from the romance of which it is inseparable, and with the history of which it descends, making antiquity picturesque, and affording at the same moment a powerful physical protection. Some of the largest ivies in England are probably those at Brockley Hall, Somersetshire, where they brace up the old trees with their friendly clamps, rendering them at the same time, as is the wont of ivy, cheerful in winter; and for beauty there are none to be found grander than those of Kenilworth. The lower walls of this famous ruin they ornament with green and shining arabesque; and from the upper ones they roll out magnificently in rich and massive cornices. The variety in the leaves of ivy is often thought to indicate a difference of kind. But it is a variety connected merely with different stages of growth. While young, and as long as the stems have a wall or tree to attach themselves to, that is to say, closely, as if they were glued, inch by inch, the leaves are angular and 3—5-lobed in innumerable variety; at this time also they are often beautifully tinctured with red or purple, or veined with white, or wholly yellow, especially on the terminal and zigzag branchlets that run, like vegetable centipedes, up trees, and over the surface of damp walls and rocks. Mounting upwards by means of their root-like suckers, which are thrown out abundantly from the surface, the stems in due time reach the top of their support. They now elongate but little, becoming woody, and forming large bushy heads, which produce flowers and fruit, and the leaves of which are all ovate or elliptical, but still possessed of the characteristic polish, and with long petioles. Such leaves are produced only upon the branches that float into the air when the plant is attached to trees or buildings; or that form a kind of hedge along the top, when growing against an old wall;—and it is only upon these, literally the very tops of the plants, that flowers and fruit are found. If the stem have suckers upon it, there are neither. Examples are known of ivy ascending to the height of a hundred feet before it becomes disengaged enough to blossom. "Irish ivy," a native of the Canary Islands, is distinguished by its scaly pedicels, and larger leaves. Besides this, there are many varieties with delicately shaped and variegated leaves, which adapt them well for tapestry to garden-walls; also the "golden-leaved," which in spring seems a mass of yellow flowers, and the "yellow-berried," which is probably the kind referred to by Virgil when he speaks of the "*pallentes ederas*" of Œbalia. Everywhere in his classic country, ivy, as in England, spreads its dark-green vesture over the ruin; when we have contemplated Kenilworth to our content, we may reflect that ivy grows also upon the tomb of Cecilia Metella.

2. Musk-root—*Adox'a Moschatel'lina.*

Damp and shady hedgebanks, and in moist woods, growing in large patches; common. Fl. April. (In fruit in the Isle of Wight.)

Curtis, i. 99; E. B. vii. 453; Baxter, i. 42.

By some authors referred to the *Caprifolia'ceæ*, and, if rightly so, vacating a place which should probably be filled by the *Hydrocot'yle*. The æstivation is not valvate, as in the rest of this family, and the petals are united instead of free. Perhaps allied, through *Chrysosple'nium*, to the *Saxifraga'ceæ*.

The exotic representatives of the Araliaceæ consist chiefly of handsome shrubs belonging to the typical genus, mostly from Japan, and including the celebrated plant from the pith of which "rice-paper" is prepared, namely, the *Ara'lia papyrif'era*. The stem of this plant, which in China is 6—9 inches in circumference at the base, and nearly the same size all the way up, grows 5—6 feet high, and is crowned with noble palmate leaves, the undersides as well as the twigs covered with rich brown pubescence that readily comes off. The pith is obtained from the upper part of the young stems, as described in Mr. Fortune's "Residence among the Chinese" (1857, p. 232.) Others of this genus in much esteem for the greenhouse are *Ara'lia leptophyl'la*, *macrophyl'la*, and *Siebol'dii*, the last named with lanceolate leaves. The "Angelica-tree," a native of North America, is *Ara'lia spino'sa*. (Bot. Mag. xxvii. 1085.) This noble plant produces a single stem, with a crown of handsome leaves, resembling those of the Angelica, but very much larger, and which form a fine umbrella-like head. In figure, they are quite peculiar among shrubs. The flowers are white, and borne in numerous panicled umbels that appear in autumn, the epidermis of the branches covered, like that of the *papyrif'era*, with velvety down, stellate when submitted to the microscope, while the stem below is sometimes prickly. Though only a shrub, this plant has quite the habit of a tree, lifting its grand crown of foliage to the height of 10 or 12 feet from the ground, and upon a lawn makes a truly beautiful appearance. After flowering, it usually dies down to the root, from which, however, suckers soon arise. *Cusso'nias* are evergreen conservatory-shrubs from the Cape of Good Hope, with digitate leaves. *Gasto'nia palma'ta* has palmate leaves and large ivy-like umbels of whitish-green flowers. *Pa'nax* is a genus of herbaceous plants with ternate or quinate leaves, and insignificant yellow or greenish blossoms (xxxiii. 1333, 1334.) *Actinophyl'lum digita'tum* is a fine shrub from the East Indies. *Tupidan'thus calyptra'tus*, (formerly called *Ara'lia* *pul'chra)* from Japan, *Sciadophyl'lum Brown'ii*, and other species from Jamaica, are also very handsome. *Gun'nera perpen'sa* (l. 2376.) is an anomalous plant from the Cape of Good Hope, with leaves resembling those of the marsh-marigold, and diœcious and yellowish flowers in racemose umbels, with the parts in twos, and a solitary ovule.

CXXXVI. THE MISTLETOE FAMILY.—*Lorantha'ceæ.*

Shrubs, to the number of 400 species or more, belonging chiefly to the equinoctial regions of America and Asia, and noted for their parasitic nature. Nearly the whole are accustomed to seat themselves upon the stems and branches of other and larger shrubs or trees, and to suck from them a considerable amount of nutriment, usually compensating, however, what mischief they may inflict, by great beauty of foliage and flowers. The latter are often scarlet or orange-coloured, and in the *Loran'thus odora'tus* of Nepal they are sweet-scented.

One species British.

A shrubby perennial, the stem about an inch thick, and with a broad base that attaches it to the surface of the boughs of certain trees, and in the substance of which it is a little way embedded; the branches numerous, repeatedly-forked, roundish, somewhat succulent, and jointed, the internodes readily separating, and resembling the long bones of a skeleton. Leaves opposite, narrow-oblong, 2—3 inches in length, entire and leathery, the branches and foliage forming collectively a light but dense and yellowish-green bush 2—4—5 feet in diameter. Flowers small, nearly sessile in the forks of the branches, greenish-yellow, tetramerous, and unisexual, the male ones growing 3—5 together, the females solitary or nearly so. Calyx in both sexes very minute. Petals of the male flowers short, thick, and triangular, with an anther adhering to the surface of each. Petals of the female flowers extremely minute. Ovary ripening into a white semi-translucent berry, the size of a large pea, and composed of sticky pulp, with a solitary seed in the centre. COMMON MISTLETOE.

HABITATS AND DISTRIBUTION.

COMMON MISTLETOE—*Vis'cum al'bum.*

Chiefly upon old apple-trees and hawthorns; occasionally upon maple, poplar, laurel, elm, hazel, &c. Scarcely ever upon the oak. Common in the south, and especially in the apple districts of the west of England, but not known in either Scotland or Ireland. Fl. April, May. Berries ripe at Christmas.

E. B. xxi. 1470; Baxter, i. 40.

The extreme rarity of the occurrence of the common English mistletoe upon the oak, has led to the impression with many persons that the plant used in Druidical ceremonies was the *Loran'thus Europæ'us*, a species resembling the common mistletoe in general aspect, but with longer sprays and broader leaves, and 6-petaled flowers borne in racemes. The Loranthus is a native of continental Europe, at least of the south-eastern parts, where it is parasitic upon the oak as well as upon other trees, and is thought perhaps to have grown in Britain in the Celtic times, and to have been long since exterminated,—possibly as far back as the introduction of Christianity, and by the Druids themselves. But the hypothesis seems unnecessary, since the simple fact of the extreme rarity of oak-fed mistletoe would give it sanctity, especially in minds that were already disposed to venerate the tree itself,—a tree famous from immemorial antiquity, and consecrated in the earliest ages of eastern symbolism. The very name of Druid, though proximately Celtic, implies connection with oaks and oak-woods, being cognate with δρυς, the ancient Greek appellation of the oak, and which in another and happy application, is familiar to every fern-lover in "Dryopteris." The burden of the old song, "Hey, derry down!" is a relic of some primæval hymn or chant, the chorus of which was, "Let us go to the oak." Not only is the oak generally passed over by the mistletoe; the Conifers are likewise as little haunted by it, or at all events, in England. It grows, or grew, upon a Cedar-of-Lebanon near Taunton, but in connection with pines or firs in this country is not upon record, though in the sandy plains of northern Germany, wherever *Pi'nus sylves'tris* is the dominant tree, it is not uncommon to find the parasite crowding the branches. The only other Loranth found wild in Europe is the *Arceutho'bium Oxyce'dri.*

Though a parasite, and hurtful to the trees on which it seats itself, mistletoe is still a beautiful ornament to them. The gleam of the white berries is very peculiar and attractive; it is when they are ripe, and in request, to mingle as pearls with the red coral of the Christmas holly, that the plant becomes most conspicuous, a "golden bough" among the denuded branches, scarcely inferior to that famous one sought by Æneas.

Why mistletoe should not be admitted into places of worship at Christmas, along with other evergreens, is not explained. The ancient pagan use can be no reason, since many plants that Christianity approves were dedicated to heathen deities;—possibly it may be that mistletoe is one of the plants which fancy and superstition have fixed upon as Eve's "forbidden fruit." That, at all events, may account for its being turned, in these degenerate days, once a year at least, into the tree of privilege! Even in ecclesiastical sculpture and wood-carving, mistletoe scarcely ever appears. Perhaps the only example is that in Bristol Cathedral, where it is found, mingled with oak, upon the tomb of one of the Berkeleys. The seat of this ancient family is situated in the very heart and centre of the mistletoe district, or what is nearly the same thing, in the midst of the cider-country, and the introduction of the plant upon the monument may perhaps refer to some great service connected with apple-culture. The tomb which bears the carving adjoins the Newton Chapel.

CXXXVII. THE SANDALWOOD FAMILY.—*Santala'ceæ.*

In the East Indies, Australia, and the South Sea Islands, the Santalaceæ are trees and shrubs, *San'talum al'bum*, and probably two or three others, supplying the celebrated cabinet-material called sandalwood. In the northern hemisphere they occur only as little weeds. The species, however, are in all cases distinctly marked by their single perianth, valvate æstivation, inferior ovary, 4—5 stamens, and one-celled ovary containing several ovules, but always of definite number, and attached to a central placenta, from the summit of which they are usually suspended. About 110 have been ascertained, including one indigenous to Britain.

Root-stock perennial, thick, yellowish, and woody. Flowering-branches annual, more or less procumbent, stiff, usually simple, and spreading fanwise to a distance of 6—12—18 inches. Leaves linear or oblong, and about an inch in length. Flowers in terminal racemes, with three bracts to every pedicel, the ovary greenish-yellow, the 4—5 deep lobes of the perianth white, and with a tuft of white hairs that reach up to the anthers. Fruit small, ovoid, and green. COMMON THESIUM.

HABITATS AND DISTRIBUTION.

COMMON THESIUM—*The'sium linophyl'lum.*

Dry pastures, and grassy banks and downs, in the extreme south of England, but always upon chalk. Isle of Wight, very abundant, and especially fine at Ventnor. Fl. all summer.

E. B. iv. 247; Baxter, iv. 263.

San'talum al'bum, in leaves, inflorescence, and general aspect, resembles privet, but the flowers are purple, tetrandrous, and with an inferior ovary. *Osy'ris al'ba* is a rare shrub with panicles of white flowers, and slender flexible branches. *Fusa'nus compres'sus* is a little shrub from the Cape of Good Hope, with inconspicuous greenish flowers and foliage like that of the spindle-tree. *Hamilto'nia oleif'era*, from North America, is of similar character. All three are unisexual and polygamous.

CXXXVIII. THE DOGWOOD FAMILY.—*Corna'ceæ.*

Shrubs and small trees generally of ornamental character, and a few attractive herbaceous plants, constitute this very interesting family, representatives of which are scattered over all the temperate parts of Europe, Asia, and North America, and extend as far eastwards as Japan. The leaves are simple and undivided, destitute of stipules, more or less ovate, usually with large veins that flow in curves from the midrib towards the apex, generally entire, and, with a single exception, opposite. The flowers are regular, tetramerous, with four stamens, an inferior ovary, and frequently a large petaloid involucrum, which compensates the insignificance of the actual blossoms. The ovary is 2—3-celled, with a solitary ovule in each cell, and ripens into a little drupe. The inflorescence is capitate, umbellate, or corymbose.

The involucrum, which is always present in the herbaceous species, indicates the relationship of the family to the Umbelliferæ; it is allied also to the Caprifoliaceæ, but distinguished by the free petals. The æstivation is valvate, and the flowers are occasionally, by abortion, unisexual.

Two species British.

1. A shrub 3—6 feet high, with many slender branches that become red when full-grown. Leaves opposite, broadly-ovate, 2—3 inches long, petiolate, green on both surfaces, nearly glabrous when mature, and in autumn turning deep crimson. Flowers white, rather small, in terminal corymbs 1½—2 inches across, the 4-lobed calyx microscopically minute, the four petals narrow, tapering, and pointed. Fruit black, globular, the size of a small pea, and very bitter. COMMON DOGWOOD.
2. An elegant little herbaceous plant; the root-stock perennial, the flower-stems annual, erect, 3—6 inches high, simple (except two short branches near the summit), and bearing a few ovate and sessile leaves an inch or two in length. Flowers minute, dark-purple, in a little terminal umbel, with an involucrum of four large white bracts that together resemble a solitary corolla of four white petals, and eventually turn reddish and then green, like the sepals of the Christmas-rose. Fruit red and globular, the cluster, when ripe, resembling that of the honeysuckle. DWARF CORNEL.

HABITATS AND DISTRIBUTION.

1. COMMON DOGWOOD—*Cor'nus sanguin'ea.*

Woods and hedges, chiefly upon chalk and limestone. In the south of England common; rare in the north and in Ireland, and in Scotland perhaps only where planted. Near Bristol very plentiful. Fl. May, June.

E. B. iv. 249; Baxter, ii. 114.

2. DWARF CORNEL—*Cor'nus Sue'cica.*

Mountain sides and heathy places in the north. Plentiful in the Highlands of Scotland. Abundant on the Cheviots; and found also near Scarborough. In Ireland not met with. Fl. July, August.

Curtis, iv. 587; E. B. v. 310.

Several of the genus *Cor'nus* occur commonly in gardens and shrubberies, especially the *Cor'nus al'ba*, a shrub with twigs so remarkably red as to be told at once by its bark,—a circumstance very natural in a dogwood. The leaves are several inches long, and the white fruit resembles that of the mistletoe. *Cor'nus mas'cula* (the "*Cornus*" of the ancient poets, and famous in mythology) is generally known as the Cornelian-cherry. The little yellow flowers grow in axillary clusters of 10—20, with a fence of four concave and yellowish bracts, and appear, before the leaves, in February and March; the fruit, mature by autumn, is red and of the figure of a small acorn. In England, however, it is seldom seen. The greater portion of the flowers, in trees less than twenty years of age, contain stamens only, (whence the name *mascula*) and of course drop off without yielding any result. Older ones, in favourable seasons, sometimes produce plentifully, and become highly ornamental, the fruit being bright and transparent, and hanging for a long time upon the tree. *Cor'nus Flor'ida* (Bot. Mag. xv. 526.) is known by its great white 4 leaved involucrum, tinted with violet,—large flowers, and scarlet fruit. This truly ornamental tree is a native of Virginia and Carolina, attaining a height of 20—30 feet, and is decidedly the handsomest of the genus. One plant of the family is universal,—the common "spotted laurel," botanically *Au'cuba Japon'ica.* Everyone knows the large yellow-blotched leaves of this plant, and the compact little bushes that it forms even in town-gardens, for which, being evergreen, and indifferent to smoke, it is eminently valuable. The minute reddish-brown flowers appear in May, quite concealed among the foliage; they are females only,—the plant being diœcious—and as individuals of the feminine gender have been the only ones possessed in England and even in Europe until quite recently, they are never succeeded by actual fruit, though little seedless berries the size of grains of wheat make their appearance occasionally. The genuine berries are the size of a sloe, orange-coloured externally, and with a sweetish flavour, and may be expected soon to add to the beauty of this popular shrub, the male plant having now been obtained from Japan. The flowers of the latter are of similar figure and colour to those of the female, but contain four little stamens instead of a pistil, and the leaves are of a uniform green, as indeed those of the female plant are reported to be in their own country. *Bentha'mia fragif'era,* introduced from Nepal in 1825, is one of the most attractive plants hitherto received from that fertile region. The leaves are lanceolate, acuminate, and evergreen; the inconspicuous and greenish flowers grow in globular and terminal heads, with an involucrum below them consisting of four large yellowish bracts, two inches across when fully expanded, and resembling a 4-petaled corolla; the fruit, which is the great charm of the plant, resembles a globular mulberry. Unfortunately this beautiful shrub is too tender for the open garden except in warm and very sheltered situations.

CXXXIX. THE WITCH-HAZEL FAMILY.—*Hamamelida'ceæ.*

Small shrubs and trees, indigenous to North America, China, Japan, central Asia, and southern Africa, and nearly allied to the *Corna'ceæ,* from which they are technically distinguished by the possession of stipules, and by the petals, when present, being imbricated in æstivation. The leaves are simple, alternate, and deciduous; the flowers are small, with the parts in fours or fives, and often unisexual by abortion; the ovary is inferior and 2-celled, and the fruit is capsular. Inconsiderable, however, as are the actual flowers, great beauty is often lent to them by a large and coloured involucrum. Very few of the species occur in gardens, and of these the only one at all common is the American witch-hazel, or *Hamame'lis Virginia'na,* a shrub growing 5—6 to 15 feet high. The leaves are obovate and acutely serrate; the tetramerous flowers are produced in axillary and nearly sessile clusters, with a 3-leaved involucrum of a fine rich-yellow colour, and expand in autumn, before the foliage of the current year has fallen. The flowers and involucres remain upon the tree all through the winter, presenting a very singular and pretty appearance, and although the former drop early in the spring, the involucres retain their hold until the new leaves appear. *Fothergil'la alnifo'lia*, from Virginia, (Bot. Mag. xxxiii. 1342.) grows 4—5 feet high; the leaves resemble those of the *Hamame'lis;* the flowers are greenish-white and fragrant, and produced in ovoid and terminal spikes, which come out in April and May, before the leaves. The newest and finest of the group is the *Rhodolei'a Champio'ni* from Hong Kong (lxxvi. 4509.) This charming shrub bears considerable resemblance to a Camellia, both in foliage, and, at the first glance, in flowers also. The latter, however, are individually small, and clustered into solitary and axillary heads of five each, the idea of the Camellia being given by their large double involucre, the five outer pieces of which are brown and silky, while the numerous inner ones are deep rose-colour, simulating petals after the manner of the bracts of the *Cor'nus Sue'cica.*

CXL. THE BIRTHWORT FAMILY.—*Aristolochia'ceæ.*

These are plants so anomalous in structure, and often with flowers so eccentric and quaint in figure, that it is difficult to associate them with any others. Some species are herbaceous, others under-shrubby, and a good many are twiners. The leaves are simple, petiolate, usually undivided, entire, and have netted veins; the stem is destitute of concentric zones; the stamens are either 6 or 12, epigynous, and sometimes gynandrous; the perianth is single, petaloid in texture and colour, and either regular, trimerous, and insignificant, or distended into a nondescript kind of bag; the ovary is inferior, 6-celled, and many-seeded. In the true Birthworts the bag is generally much curved, swollen at the lower part, and opens into two lobes at the extremity; it is often large and handsome, and of some very singular colour, and is not infrequently provided with a great pendulous flap or apron at the orifice, reminding us of certain Orchids, and presenting one of the most extraordinary objects in botanical nature.

The Aristolochiaceæ thus partake of the characters both of Exogens and Endogens; in certain other points they differ however from both. They are similar also in some respects to the *Tacca'ceæ*, presently to be described among the "Intermediate Families." Hence, until they shall be better understood, their true position in systems of classification must remain uncertain. Temporarily, they seem most reasonably placed just within the exogenous frontier, and alongside of the bisexual Epigynæ. The tropical parts of South America are their chief abodes, but they have a rather wide distribution, and two are reputed wild in England.

1. Stem erect, about 2 feet high, zigzag, and without branches. Leaves broadly heart-shaped, 1½—3 inches across. Flowers axillary, several together, about an inch in length, pale yellow, tubular, and oddly curved. COMMON BIRTHWORT.
2. A densely tufted plant, the herbage forming a dark green cushion 1—2 feet across, and 6—8 inches in height. Branches very short and close to the ground. Leaves on long petioles, nearly radical, growing two together, truly kidney-shaped, 1½—3 inches across, and very glossy. Flowers solitary, greenish-brown, bell-shaped, one at the foot of every pair of leaves, and upon so short a peduncle as to be entirely concealed. Perianth 3-lobed; stamens 12. ASARABACCA.

HABITATS AND DISTRIBUTION.

1. COMMON BIRTHWORT—*Aristolo'chia Clemati'tis.*

A plant of very ancient medicinal fame, and possibly brought originally from south-western Asia. In England found only in old-fashioned gardens, and upon ruins and in waste places near ancient monastic buildings, and there but seldom. Monastery of St. Cross, near Winchester. Borden Lodge, Wolmer Forest, Hampshire. Fl. July, August.

Curtis, iv. 639; E. B. vi. 398; Baxter, i. 28.

2. ASARABACCA—*As'arum Europæ'um.*

Woods and shady places; very rare. Yorkshire. Near Keswick. Redlynch and Amesbury, Wiltshire. Fl. spring and summer.

E. B. xvi. 1083; Baxter, iv. 250.

Common in old-fashioned gardens, at all events in Lancashire and Cheshire, having once held, like the Birthwort, a great medicinal reputation.

As'arum Canaden'se (Bot. Mag. liv. 2769.) is also an old inhabitant of gardens, and superior as a floriferous plant to the *Europæ'um*, the colour being brighter. The blossoms of both are very curious, and well repay examination. *Aristolo'chias*, of which there are many grown for ornament, belong chiefly to the greenhouse and hothouse. The *Aristolo'chia Si'pho*, from the Alleghany mountains, (xv. 534.) is, however, quite hardy, and has long been esteemed in gardens for the sake of its handsome and evergreen foliage. The leaves are cordate and acute; the yellowish-brown flowers, which come out abundantly in May and June, are bent like a siphon, and have a large bractea upon the peduncle; the stems twine to the height of 20 feet, and in their native country rise even to the tops of the highest trees. The indoor species have flowers of the most extraordinary configuration, quite unlike everything we are accustomed to see elsewhere, and in eccentricity comparable only with certain Orchids. Take, for example, the *Aristolo'chia hyperbo'rea*, a hothouse plant from northern India. The blossoms arise from the axils of the leaves, and are supported on peduncles 6—8 inches in length; the perianth consisting, as in all the rest of the genus, of calyx only, but in texture petaloid, and resembling a corolla. The lowermost portion forms a bag of the general figure of a hen's egg, or perhaps rather of the familiar mantel-piece sea-shell called the *Cypræa*, but more rounded on the lower side, narrowed at the base, and 3—4 inches long. At the summit, the bag contracts to the diameter of half-an-inch, then bends suddenly downwards, and is tubular for the length of an inch and a half. Next it opens into two great pieces, 3—4 inches long, and resembling the beak of a bird; the upper lobe folding upon its midrib, so that the margins touch for their whole length; the lower lobe spreading, and at the extremity dilating into an immense lip, 6 inches in width, and 4 inches deep, and hanging down like a crumpled apron. The colour is everywhere whitish, the inner surface most beautifully reticulated and dotted with purple, but nowhere exposed to view except on the front of the apron, which might be taken for a fragment of printed calico. The bag rises and falls to the touch of the finger like an india-rubber ball, and internally, like most of the interior of the flower, is clothed with fine white hairs. At the very base of the bag, in the inside, stands a large and erect six-fold stigma, the lobes of the size and shape of grains of rice, but in substance ivory-like, and incurved at the tips. The centre is crater-form, and to the outer surface of every lobe is attached a long and slender anther, looking like a streak of yellow pollen. The ovary is below the perianth, and might be mistaken for a furrowed thickening of the peduncle, except that it is bent at an acute angle towards the latter, forming, with the axis of the bag, the figure of an N. The tissue of the flower, when magnified, resembles that of the familiar rose-coloured sea-weed called *Ploca'mium coccin'eum.* Another fine species is the *Aristolo'chia sacca'ta*, from Sylhet, (lxv. 3640.) the flowers of which grow in two or three whorls of 4—6 each. Individually, the blossoms resemble the pitchers of the *Nepen'thes*, only that instead of being green, they are crimson, and have a purple mouth instead of a lid. The leaves of this handsome plant are ovate-cordate, and 12—15 inches in length by 4 in width; the stems are long, slender, and climbing, and, as very usual in this genus, become, when old, corky upon the surface. A splendid figure of it is given by Dr. Wallich, in the "Plantæ Asiaticæ Rariores," vol. ii. 103. What may be the special use of these singular bag-like flowers of the Aristolochias? Insects appear to be resident or contained in them as *quasi*-prisoners, and their corpses are often abundant. Possibly a kind of nutriment may be afforded to the plant by gaseous matters set free during their decay, as surmised to be the case with the sundews (p. 181.)—possibly the interior of the flower may offer a peculiarly eligible *nidus* for the deposition and hatching of eggs, and the creature be allured into it by something imperceptible to ourselves. In some kinds of Aristolochia, the lip of the flower, instead of being apron-shaped, becomes extremely attenuated, as in the *trif'ida*, the brownish-red lip of which is two inches wide at the orifice of the blossom, and then tapers like a blade of grass till not much less than a foot in length! The lower portion of the perianth is greenish-yellow. Other beautiful and extraordinary species are *Aristolo'chia cymbif'era*, (Bot. Reg. 1543.) *Aristolo'chia gi'gas* or *grandiflo'ra*, (Bot. Mag. lxxiv. 4368.) the flowers of which are so large that in South America the native children draw them over their heads as caps; *Aristolo'chia cilia'ta*, (lxvi. 3756.) *ornithoceph'ala*, (lxx. 4120.) *macrade'nia*, (lxxv. 4467.) *pic'ta*, and *labio'sa.*

SECTION 2.—UNISEXUAL EXOGENS.

CXLI. THE CUCUMBER FAMILY.—*Cucurbita'ceæ.*

An important and interesting, though not extensive family, belonging chiefly to the tropics, and to India in particular. The species are in all cases herbaceous, and exceedingly well marked, the common cucumber and melon giving an accurate idea of almost the whole, alike in their long, weak, succulent and tendrilled stems, and in their large rough leaves and succulent fruit. Technically, the characters are as follow:—

Leaves large, alternate, petiolate, simple, fan-lobed or palmate, and rough with tubercles. Inflorescence axillary, the flowers either solitary or slightly clustered, always unisexual, regular, and pentamerous. Calyx usually small. Petals more or less united, often strongly marked with netted veins, generally yellow, sometimes white or greenish, and occasionally fringed. Stamens of the male flowers five, the filaments short, the anthers usually very large, and in the ordinary genera sinuous, or curved and wavy like the letter S turned sideways and with its curves almost in contact. Sometimes, as in Bryony, they are so intimately adjoined as to look like only three. Female flowers with three large lobed and velvety or fringed stigmas, and a conspicuous ovary below the perianth. Fruit succulent and three-celled; in most cases enormous for the size and brief existence of the plant; and with the peduncle articulated to the base. Seeds usually very numerous, generally thin, broad and flat, and wrapped in a peculiar skin resembling tissue-paper.

In habit, foliage, fruit, and tendrils the Cucurbits are strikingly like the passion-flowers; the separation of the stamens and pistils, and the position of the ovary, alone keep the two families distinct. No plants grow more rapidly, or cover an equal space of ground in so short a time, a fact explained by their natural habitat being amid the boughs and branches of trees, for mounting into which the powerful tendrils so admirably adapt them. Were trees or shrubs always at hand to receive their grasp, we should never see them, as in our kitchen-gardens and hot-bed frames, trailing upon the earth, and putting out green spires that seem purposeless. The tendrils are quite different from those of vetches and peas, in which they terminate the leaves and have lateral branches. Here, in the Cucurbits, as in the passion-flowers, they consist of simple coils, produced from the axils, often several inches in length, and when not stretched out by the dragging weight or the growth of the stems, wound so close as to form spiral tubes that resemble bell-springs. They are prone moreover to twine first one way, and then the contrary, changing the direction in the middle of the spire. No plants supply finer examples of unisexual flowers. In some species the males and females grow upon different individuals, but in most kinds they are seated upon the same. In regard to properties and secretions, the Cucurbitaceæ are upon the whole to be considered acrimonious; for although excellent fruits are yielded by certain species, as the melon, the cucumber, and the vegetable-marrow, others, such as the colocynth and the elaterium, afford cathartics of great energy; and there is good reason to believe that even the former owe their freedom from poisonous principles to cultivation.

One species British.

Root large, tuberous, and perennial. Stems and branches annual, very abundant, slender, climbing among shrubs, and mounting over hedges, by means of their tendrils, to the extent of many yards. Leaves plentiful, 3—6 inches across, more or less deeply divided into five or seven broad, angular, and coarsely-toothed lobes (the middle lobe longer than the others), and rough upon both surfaces. Flowers mostly diœcious, in little clusters of 3—6, star-like and pale yellowish-green. Females succeeded in autumn by globular red fruits the size of a pea. COMMON BRYONY.

HABITATS AND DISTRIBUTION.

COMMON BRYONY—*Bryo'nia dioi'ca.*

Hedges; principally in the south of England, where it is often very plentiful, but disliking the neighbourhood of the sea. Occasionally, for want of support, forming a tangled mass upon the ground, and sometimes ascending small trees. Not found in Scotland or Ireland, unless where planted. Fl. June, July.

E. B. vii. 439; Baxter, ii. 83.

Bryony is one of the most elegant of our native plants, covering the hedges by midsummer with a rich and dark-green drapery. It is very commonly confounded with the mandrake, or *Mandrag'ora vernal'is*, the root being much of the same figure and dimensions. But the latter, instead of being a tendrilled climber, is a low-growing plant, with the aspect more of a primrose than of a cucumber, and with white and bell-shaped flowers like those of the deadly-nightshade. Some call the present plant "*White* Bryony," to distinguish it from the Tamus, which was formerly called "Black Bryony," a name only leading to confusion.

In gardens and greenhouses the Cucurbitaceæ are valued principally on account of their fruit. The cucumber, *Cu'cumis sati'vus*, is the only instance, perhaps, of a raw fruit being cared for, and actually edible, only while in a state of unripeness. When mature, it is yellow externally, and in the inside a mass of yellowish pulp, abounding like a pumpkin, with large flat seeds, the entire bulk being twice or thrice that of the cucumber as we are accustomed to see it served at table. The

Vegetable-marrow, *(Cucur'bita ovif'era)* the pumpkin, *(Cucur'bita Pe'po)* and the squash-gourd *(Cucur'bita Melo-pepo)* need the fire before they can be eaten, or in the case of the latter, to be perfectly ripened under a hot sun and a cloudless sky. All these plants, along with the inestimable melon, *(Cu'cumis Melo)* are originally from the warmer parts of Asia, and have been cultivated from time immemorial. The pumpkin (properly *pompion)* is in our own country chiefly valued as supplying "ornamental gourds," other varieties of which are yielded by the orange-gourd or *Cucur'bita auran'tia*, and the wart-gourd or *Cucur'bita verruco'sa.* Nothing among fruits can be more diversified in form than these ornamental gourds, and in colours and markings they present some of the finest tints in nature. Some resemble little golden-yellow plums; others are globular, or egg-shaped, or formed like an hour-glass, or a siphon, or a crown, or a pear, or a powder-flask, the size gradually increasing in different varieties till the prodigious weight of over 200℔. is attained, and a circumference of 8 or 10 feet. These very huge ones, the most corpulent productions of vegetable nature, are globular or nearly so, being usually compressed at the poles. Perhaps the most interesting varieties are those that have the figure of a bottle, resembling the fruit of the celebrated *Lagena'ria vulga'ris*, or true bottle-gourd. These, including the long and slender neck, measure 12—18 inches from base to extremity, and are no doubt the natural models from which the artists of ancient times designed their amphoræ and other vessels for holding fluids. They might still be referred to with advantage by the manufacturers of decanters and ladies' scent-bottles. The predominant colours of gourds, when ripe, are green and yellow, but they are often most elegantly striped and mottled, creamy-white mixing with the darker tints; while others are brilliant carmine, scarlet, or black, more or less dashed and lined with hues of powerful contrast. To obtain these beautiful fruits is a very easy matter. The seeds are sown upon a hot-bed in the spring, like those of cucumbers, and the plants transferred, when a few inches high, to the vinery or conservatory, and placed against a trellis. If such shelter cannot be given them, in genial districts and fine seasons, they will thrive and fruit abundantly if trained against a wall that looks southwards, and even if let trail upon the ground. For an arbour they are very beautiful, the abundant foliage swinging lightly in green wreaths, and the branches becoming woven together with tendrils. But it is most important that they receive no check after being planted out, and that they have a continual supply of good food. Hence it is well, if convenient, to let the plants remain upon the hotbed. The common kinds are hardy enough to grow almost anywhere. An orange-gourd against a rustic trellis, or coiling its long shoots around and among the branches of some old tree, and loaded with its mimic Hesperian fruits, that daily became more conspicuous through the decay of the leaves, is in autumn one of the most pleasing sights the garden affords. Even if they fail to produce ripe fruit, gourds are glorious plants for a large garden, not only in the luxuriance of their foliage, but in the magnitude of their flower-vases, deep down in which we may watch the bees plying their golden labour. Of Cucurbits needing at all times the protection of the conservatory, we have another very interesting series in such as the "snake-cucumber." The common snake-cucumber or *Trichosan'thes angui'na* (Bot. Mag. xix. 722.) has small white flowers with fimbriated petals, and fruits 3 or 4 feet long, but not much thicker than the thumb, and which hang down from the branches like so many green snakes. *Momor'dica Charan'tia* (li. 2455.) has small yellow flowers and handsome yellow fruits of an elliptical figure, 6—12 inches in length, pointed at each extremity, and most curiously ribbed and warted over the whole surface. *Abro'bra viridiflo'ra* has the leaves very deeply and palmately pinnatifid, and produces abundance of little shining scarlet fruits, that make it an admirable ornament for twining round a vase.

One of the most important plants of the family is that which supplies the "elaterium" of the druggists' shops. This is the *Ecba'lium agres'te*, formerly called *Momor'dica Elate'rium*, (xliv. 1914.) a native of the south of Europe, and occasionally grown in curious gardens, under the name of the "spirting-cucumber." It is immediately distinguished among the Cucurbitaceæ by the want of tendrils, and by the singular dehiscence of the fruit, the peduncle of which falls away, and leaves an aperture through which the pulp gushes out, carrying the seeds along with it. In hothouses, but rarely, there is also to be seen the splendid *Telfair'ea* or *Feuillæ'a peda'ta*, from Zanzibar, (liii. 2681; liv. 2751.) a truly wonderful plant with pink or purple corollas, the margins of which run out into abundance of delicate laciniæ that resemble those of the flower-like heads of the marine animals called Amphitrite. This plant is also known by the names of *Ampelosi'cyos scan'dens* and *Jollif'ia Africa'na*. The curious skeleton-cucumbers brought from abroad for museums, and which in the dry state consist of little more than tough network and black seeds, are the produce of *Luf'fa fœt'ida*, (xl. 1638.) a plant sometimes grown in large collections. *Angu'ria triloba'ta*, also occasionally grown, has pink and diandrous flowers.

CXLII. THE BEGONIA FAMILY.—*Begonia'ceæ.*

Begonias are under-shrubby, rather succulent, and moisture-loving plants, natives of the East and West Indies, the warm parts of South America, and the island of Madagascar. They are esteemed for the extreme elegance and singularity alike of their foliage and their flowers, and are conspicuous ornaments of every good conservatory. The leaves are alternate, simple, petiolate, usually undivided, but often serrate, and for the most part remarkably oblique, or larger upon one side of the midrib than upon the other, with the general form of the sea-shells called *Halio'tis*, from which circumstance the species that show this peculiarity well, are popularly called "elephant's ears." In a few species they are lobed and palmate, as in *Bego'nia ricinifo'lia* and *Bego'nia herac'leifolia*. Many varieties and hybrids have been raised of late years, through the sportiveness of the foliage in respect of markings, and the leaves of these in particular, are often hairy, and of a deep red colour underneath, and on the upper surface beautifully marked with silvery arches. In others they are perfectly glabrous, spotted with white, or light green on both surfaces, and shining; while in *Bego'nia fuchsioi'des* they are so glossy as to look as if recently oiled.

When held between the eye and the light, so as to become transparencies, the leaves of the deep-coloured varieties present an extremely rich appearance, which in many is not lost by their being dried. The flowers grow, for the most part, in large panicles or corymbs, which are elegantly light and slender, almost always more or less pendulous, and with the succulent branches and pedicels far asunder, so that every blossom hangs free. The buds are remarkably flat before expansion, resembling little circular shells, slightly convex on the surfaces. In colour they are usually pink or white, rarely red or yellow, and never blue or purple. Most of the species have the stamens and pistils in separate flowers, and occasionally these organs are produced upon separate plants. The male flowers consist, ordinarily, of four oval and petaloid pieces placed crosswise, one pair at right angles above the other, and generally much larger, the upper pair spreading widely, and disclosing a dense tuft of bright yellow and club-shaped anthers. The female flowers usually consist of about half-a-dozen pieces, similar in colour and texture to those of the males, but very much narrower. Below the perianth is a large triangular ovary of the same satiny lustre, and within it are three 2-lobed and sessile stigmas of a rich gold colour. The fruit is a 3-celled capsule, with the wings persistent and enlarged, and contains abundance of minute brown seeds.

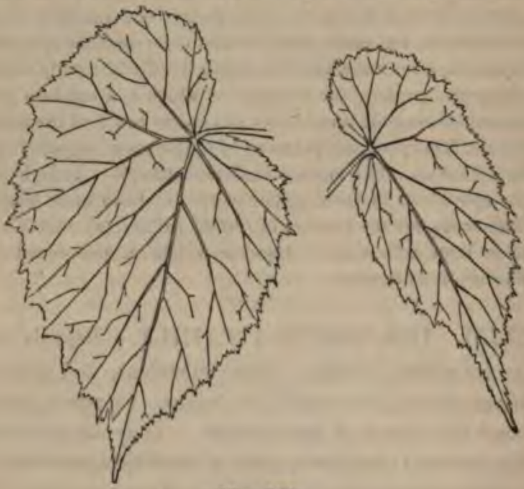

Fig. 169.
Begonia leaves.

The chief exceptions to these characters are that sometimes only two of the usual pieces of the perianth are developed, and that in some species the male flowers are polypetalous. There are species without stems, bearing their flowers on radical scapes; there are others which in their native countries are climbers. The aggregate of the structure shows the affinity of the Begonias to be chiefly with the Cucurbitaceæ, which they agree with also in their splendid illustrations of unisexual flowers.

Among the finest kinds met with in hothouses are the *Bego'nia argyrostig'ma*, the leaves of which appear strewn with seed-pearl, like those of the Sonerila; the *Bego'nia cilia'ris*, which has them adorned on the under-surface with red fringes, that extend even to the petioles; and the *Bego'nia Rex*, in which the leaves are spanned by broad and shining arches of a peculiar grayish colour. It is from the *Rex*, by crossing with the *splen'dida* and some of the others, that gardeners have procured most of the novelties in which modern phyllomania takes so much delight. *Bego'nia octopet'ala* (lxiv. 3559.) has white flowers, 2 or 2½ inches across, resembling those of an anemone, and borne in a great corymb on the summit of a stalk that rises direct from the root. *Bego'nia monop'tera* (lxiv. 3564.) when in fruit, presents a very odd appearance, the capsule having only one wing. *B. dipet'ala* (lv. 2849.) sometimes with pearl-spotted leaves, is one of those in which the flowers are shorn of half their parts. *B. xanthi'na* and *argen'tea* have yellow flowers. *B. parvifo'lia* is a delicate little species with light green leaves and pure white blossoms, exceedingly pretty for ladies' bouquets.

CXLIII. THE OAK FAMILY.—*Coryla'ceæ* or *Cupulif'eræ.*

The Oak-family leads the way to several large companies of trees and shrubs, some of the former of which have been esteemed in all ages as the noblest and most beautiful in nature. By many botanists these various groups are associated under a single and very expressive name,—that of *Amentif'eræ*, or the "catkin-bearers," and in the collective there is no objection to the use of it. But there are important differences, both in the veining and in the figure of the leaves, and in the structure of the female flowers and of the fruits, so that strongly as the various genera resemble one another in respect of the "catkins," it becomes expedient to distinguish them into six or eight separate families. Of these, the most interesting and the most largely represented in Britain, are the Oak-family, the Birch-family, and the Poplar-family. Next come the Walnut-family and the Plane-tree family; and afterwards some little groups consisting only of shrubs. It is the

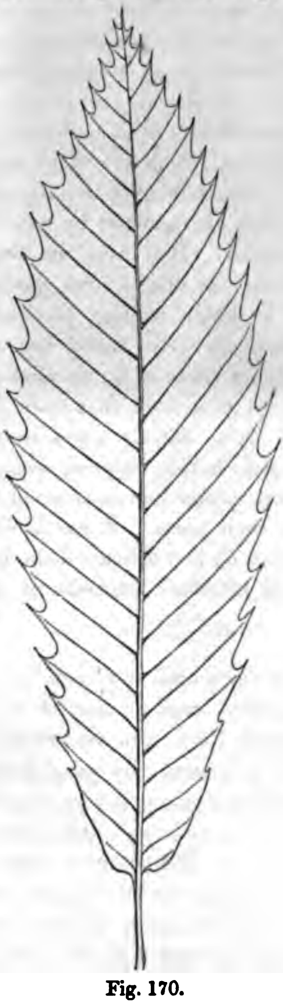

Fig. 170.
Spanish chesnut.

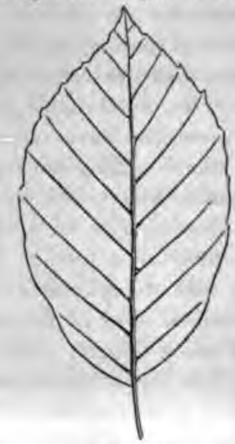

Fig. 171.
Beech.

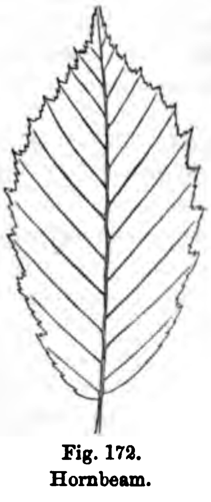

Fig. 172.
Hornbeam.

catkin-bearing trees that in England compose the great mass of those living and glorious temples we call the woods. The lime, the ash, and the sycamore grow in the hedge-rows and open country; but the silent forest, where we lift up our eyes as into the clouds of a green heaven, where we are always young, and the unquiet world seems to have slipped away like the worn-out skin from the enamelled snake,—this is made chiefly of the immortal Amentiferæ, the silver-columned birch, the patrician beech, and the Olympian oak, those grand trees which, in their youth so fair and comely, in their age make of the wilderness a new Palmyra.

The Amentiferæ are without exception unisexual, some kinds having the male and female flowers upon the *same* tree, when they are said to be "monœcious," or "occupants of one house:" others having them upon two different trees, when they are called "diœcious," or "occupants of two houses." The males are clustered in "catkins," that is to say, light racemes formed of a slender stalk, 1—3—9 inches long, usually with numerous small bracts regularly disposed upon it for the whole length, and with a tuft of stamens under every bract. The females are produced either in catkins of similar form, but smaller, with one or two ovaries beneath the scales instead of stamens, or they grow several together in the interior of buds, the stigmas alone being exposed to sight. Occasionally, instead of being loose and slender, the catkins are compact and ovoid or nearly globular; and though in general stalked and pendulous, they are sometimes sessile and nearly upright. Most of the species bloom before the leaves appear, or not much later than the period of the earliest verdure, and very often in cold and dismal weather, when the fireside is more inviting than the woodland, from which circumstance, along with the incompleteness and simple character of the blossoms, it is a very common belief that these trees are *flowerless*. But as we have seen before, no plants are absolutely devoid of flowers, that is to say, of reproductive apparatus, and it is never anything more than a question of magnitude and effective display. Probably enough, individual trees may be negligent in producing flowers, even for several years together, and very *young* Amentiferæ are not to be expected to be found in bloom. Upon one tree or another, flowers, however, may always be discovered. The leaves are for the most part broad and flat, —never needle-shaped, as in pine and fir-trees—and almost always deciduous.

The Oak-family is essentially distinguished among the Amentiferæ by the usually large and nut-like fruit being seated in a leafy or woody "cupule," from which it often projects a considerable distance, as in the case of the common acorn. A good, though not peculiar character is also found in the veins of the leaves, which very often proceed straight from the mid-rib to the margin, and form regularly parallel lines, as in Figs. 170—174. No family is of more importance, nor does it require for its value to be understood that more be said of it than is conveyed in the names oak, beech, chesnut, hazel, and filbert. Cork for the stoppers of bottles; galls for the manufacture of ink; valonia and bark for the use of the tanner; along with many other invaluable articles of commerce, are the gifts of different species. Others yield inestimable timber, and while alive and growing rank with the most superb and aristocratic productions of nature, whether looked at in the emerald pride of summer, or in autumn, when richly "distained with dusky gold." Over 250 species have been discriminated, the whole growing spontaneously in the forests of the temperate parts of the northern hemisphere.

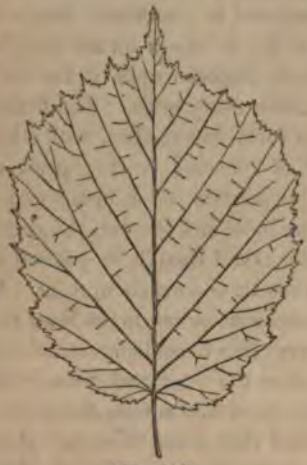

Fig. 173.
Hazel-nut.

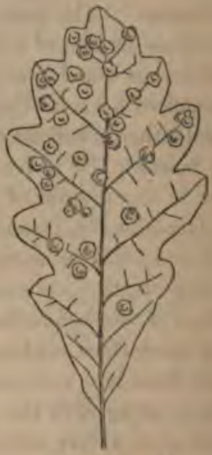

Fig. 174.—Oak.
(Under side of leaf, showing "spangles.")

Six are indigenous to Britain.

A.

Flowers in company with the young leaves.

- Male catkins ovoid, compact, pendulous, with 5—12 stamens under every scale. Female catkins globular. Leaves ovate, 1½ inch long, entire, or nearly so; ciliated, and with numerous light-brown scales hanging about the petioles while young; when fully grown, perfectly glabrous, dry, and in texture paper-like. 2. COMMON BEECH.

** Male catkins cylindrical or spicate.

  a. Male catkins spicate, upright, 6—8 inches long, with 5—20 stamens in every cluster. Female flowers 3 together. Leaves oblong-lanceolate, 6—10 inches long, glabrous on both sides, acute and serrate, the serratures ending in sharp points. 3. SPANISH CHESNUT.

(*Flowers in company with the young leaves.* Male catkins cylindrical or spicate.)

b. Male catkins pendulous or nearly so, 2—3 inches long.

Leaves ovate, 2 inches long, pointed, doubly serrated, plaited while young. Male catkins cylindrical, sessile, 1½ inch long, with broad and sessile scales. Stamens about twelve under every scale. Female catkins slender and loose. 4. HORNBEAM.

Leaves 3—4 inches long, deeply and irregularly feather-lobed.—Male catkins small, interrupted, without or with only very small bracts, very abundant, and hanging in dense yellowish fringes. Stamens 6—12. Female flowers in adjacent buds, so minute as to be almost undiscoverable. 5 & 6. COMMON OAK.

B.

Flowers appearing before the leaves. Male catkins pendulous, loose and open, pale buff or brownish, 1—3 inches long, and sessile, with about eight stamens under every scale. Female flowers contained in small lateral buds, which are indicated by their tufts of protruding crimson stigmas. Leaves, when fully developed, broadly ovate, sometimes slightly 3-lobed, doubly-toothed along the edges, coarse and downy on both surfaces, rounded at the extremity, and usually with a point suddenly projecting from it. 1. HAZEL-NUT.

When in fruit, the Corylaceæ are distinguished, primarily, by the character of the cup or husk in which the nut is seated. In the British species there are three principal varieties:—

A. Husk thin, smooth, leafy, and more or less torn or ragged at the edge.

Inner scales of the husk enlarged into large 3-lobed bracts 1—2 inches long, every bract concealing an egg-shaped and prominently-ribbed nut, about the size of a barleycorn. 4. HORNBEAM.

Husk unequally lobed, with a torn and ragged margin; the nuts solitary, rounded, perfectly smooth, and projecting half an inch or more beyond the husk. 1. HAZEL-NUT.

B. Cup short, hemispherical, circular, rough with hard scales or tubercles upon the outside, and perfectly even round the edge; the nuts, called "acorns," solitary, smooth, and projecting about an inch. Cups generally clustered in twos or threes.

Peduncles of the cups 2—4 inches long. 5. COMMON OAK.

Cups sitting close upon the stem. 6. SESSILE-FRUITED OAK.

C. Husk prickly upon the outside, closed while young, but opening at the top when ripe; nuts several in every husk.

Husk with a few scattered prickles, and opening in four persistent valves. Nuts sharply triangular, ¾ inch long, and pointed. 2. COMMON BEECH.

Husk densely covered with sharp prickles which spring in clusters from various centres, and falling to pieces when ripe. Nuts large, rounded, often flat upon one side, and bluntly angled. 3. SPANISH CHESNUT.

HABITATS AND DISTRIBUTION.

1. Hazel-nut—*Cor'ylus Avella'na.*

Woods, cloughs, and hedges; everywhere. Fl. February and March, sometimes as early as January. Nuts ripe in September.

Curtis, iii. 551; E. B. xi. 723; Baxter, v. 338.

The filbert, sometimes called *Cor'ylus tubulo'sa,* is a garden variety, having the leafy cups greatly elongated, so as completely to conceal the nuts, which are also much lengthened. Cob-nuts, Barcelona nuts, and others brought to the fruit-market, are of corresponding origin. None of our native fruit-trees are of more curious and beautiful economy. The young male catkins for the ensuing season are put forth in September, while the nuts of the current year are scarcely ripe; by February they attain their full length, and, hanging from the bare brown branches, intermingled with the innumerable crimson-tipped buds that contain the female flowers, form one of the most delightful harbingers of spring. On a fine sunny forenoon

> ————————" While yet the wheaten blade
> Scarce shoots above the new-fall'n shower of snow,"

a hazel-nut tree in a young wood is one of the most beautiful spectacles that nature affords. Every catkin is loaded with pollen, and a slight shake brings down a mist of shining particles. The leaves are often marked in the centre with a large and irregular purplish spot, and in autumn they turn to a fine light yellow. A variety, found in gardens, has the leaves deeply incised; another has almost the colour of the purple beech.

2. Common Beech—*Fa'gus sylvat'ica.*

Hedgerows, plantations, and parks; everywhere, but difficult to say where now absolutely wild, though unquestionably indigenous. Finest in Hampshire. Fl. May, after the leaves have opened.

E. B. xxvi. 1846; Baxter, v. 331.

The beech is one of the grandest of our forest-trees. It rises 50—80 or even 100 feet high, and in dimensions, when full-grown, exceeds all except the oak. In spring, when the young leaves make their appearance, the exquisite green light of a beech-wood is without parallel. No tree has leaves so delicately thin and translucent; they are edged, when they first come out, with silvery and silky hairs like white eyelashes, others clothing the veins of the under surface; and to add to their beauty, clinging to the slender flexile twigs on which they grow, are innumerable rose-coloured "perules,"—the scales which wrapped them while yet in the bud, and which, now that they are no longer wanted, are gradually turning to a delicate light brown and falling off. The quantity of fallen perules which strews the ground during May and the early part of June is truly enormous, and makes the pathways where beeches grow resemble a threshing-floor. The buds, before they open, are much attenuated, and resemble brown thorns. No tree forms woods so dry and pleasant to walk in, though grasses do not thrive beneath the shade; and in autumn, it eclipses every other in the splendour of its auburn and golden dyes. The thin smooth leaves are peculiarly adapted to reflect the rays of the setting sun, and their own colour being rich in the highest degree, they glow under the illumination with a lustre that well-nigh rivals it. The "purple" beech is a variety differing in no respect but that of colour from the common form of the tree; and the copper-coloured a sub-variety of the purple, in which the deeper shade is less developed. The foliage of both, when it first comes out, is of a fine cherry-red. Another variety of this tree, called *lacinia'ta*, has the leaves lanceolate, and deeply and irregularly pinnatifid. Branches with foliage of the normal character often sprout among its boughs, and prove what few on being first shown it are inclined to believe, that it is really the same tree in a different dress. Seedlings of the beech come up plentifully in woods and upon dry banks, and resemble young plants of the tway-blade, having a pair of large flat cotyledons, nearly an inch in length and rather more than an inch wide.

3. SPANISH CHESNUT—*Casta'nea ves'ca.*

Parks and plantations; common everywhere, but probably not indigenous, though of extremely remote introduction. Fl. May, June, in company with the leaves.

E. B. xiii. 886 (as *Fa'gus Casta'nea*); Baxter, vi. 485.

Immediately distinguished by the very large, long, simple, and symmetrically lanceolate leaves, with strong veins running parallel from the midrib to the margin, and extending beyond it in the form of little prickles. The "*horse*-chesnut," with which this splendid tree is often confounded, is quite a different thing, having compound and quinate leaves, as well as vast and superb pyramidal bunches of white flowers, those of the sweet or Spanish chesnut being greenish yellow, and scarcely attractive except to botanists. The only resemblance between the two trees, after the stature, is in the fruit, the *nuts* of the Spanish chesnut being about the same in size and of the same colour (though not so polished) as the *seeds* of its magnificent rival. The husks of the latter have scarcely any prickles, but in the sweet chesnut they are like hedgehogs; moreover, the sweet chesnut is usually flat upon one side, and often upon two sides, owing to several nuts having stood side by side in the involucrum, and at the apex there are seen the withered styles and stigmas; the seeds of the horse-chesnut, on the other hand, have a perfectly round and even surface, showing only a broad scar at the part where they were attached to the inside of the capsule.

4. HORNBEAM—*Car'pinus Bet'ulus.*

Hedges, woods, and cloughs; common, but, for the most part, planted, though no doubt indigenous, or at least in the south and south-east. Fl. April, May.

E. B. xxix. 2032; Baxter, iii. 234.

A small tree with somewhat the aspect of an elm, and with remarkably elm-like leaves. It is exceedingly valuable for live fences and garden hedges, and in the clipped and bushy form under which it then appears, is perhaps more commonly met with than as a tree. The long green involucres at once distinguish it when in fruit.

5. Common Oak—*Quer'cus peduncula'ta.*

Woods, hedges, hill-sides, parks, and plantations; everywhere. Fl. May. Fruit in September.

E. B. xix. 1342; Baxter, v. 371 (both as *Quer'cus Ro'bur.*)

The oak, from its great and impressive size, the vast age which it attains, and the hardness and durability of its timber, is in temperate countries universally acknowledged the king of trees, holding the same position with regard to other plants that the lion does among quadrupeds, and the eagle among birds. Many trees equal it in picturesque beauty, and others are not inferior in the quality of their wood, but the oak stands alone in having these advantages *combined.* It is generally 18 to 20 years old before it begins to flower and bear acorns, a circumstance prophetic of its great longevity. The ordinary height is 60—80 feet, and the maximum age fifteen centuries. No other tree is subject to such great variety, either in the form of the individual leaves, of which it seems impossible to find two exactly alike, or in general figure and aspect, and conditions of life. Stand upon some sweet hill-side, where you may look down as from the sky upon their rich round crests, and see the green sward of the valley and opposite slope, mellowed with the moving shadows, and if it be summer, some trees shall be dark green, others shall be pale; if it be autumn, some shall be fast fading and almost leafless, while others are still in their glory; and if it be spring, while one tree is in full leaf, the buds of others are only beginning to burst. Not less interesting is the oak in the great and curious variety of its inhabitants. The "oak-apples" of May and June, the "currant-galls" of early summer, the "oak-spangles" that so beautifully ornament the under-sides of the leaves in autumn, and the "artichoke-galls" that are often found terminating the twigs at the same season, are the results of the visits of as many different species of insects, all of which find in this supreme tree a congenial abiding-place, while of those that habitually rest or feed upon it there are hundreds. Besides these, there are the birds,—the throstle, the green linnet, and often seven or eight other kinds, harbouring among the branches, if they do not build their nests, so that to climb into an oak, when in the grandeur of its green life, is like entering a little city. The amber and olive of the opening buds is quite peculiar; the horizontal stretch of the lower boughs, whereby in autumn we can gather acorns without effort, almost as thoroughly so; few trees moreover give so hearty a welcome to the lucid and golden mosses that creep tenderly upon their trunks; and in extreme old age, none perhaps are so remarkable for their antlered heads. The oak, in a word, is at every season remarkable, and either grand or lovely. Though in summer, more than any other English trees, it gives us those peaceful and leafy forest-arcades where it is of less avail to go for meditation than into a crowded street; and though it is a pride to see it slaking its mighty thirst in the sunshine—every leaf the greener for the airy life it drinks so freely—even in winter and when leafless it preserves its influence;—the foliage seems cast away that we may scan, at our leisure, the innumerable lines of beauty that were hidden before.

It may be well to remark emphatically that the spangles found on the leaves of the oak, so far from being fungoid, as often supposed, are certainly induced, after the manner of galls, by some little hymenopterous insect, probably of, or allied to the genus *Diplolepis.*

6. SESSILE-FRUITED OAK—*Quer'cus sessiliflo'ra.*

Woods and hedges; common, but not so general as the *peduncula'ta*, and perhaps even less so in the south than in the north. Fl. May.

E. B. xxvi. 1845.

Distinguished by the long stalks of the leaves, and the almost total absence of peduncles to the acorns. It is by some authors considered inferior as to timber, but the question is an open one, as also its specific difference from the *peduncula'ta*, with which some botanists unite it. That there is in reality only one species of oak indigenous to Britain, and that the two names *peduncula'ta* and *sessiliflo'ra* refer us merely to the extreme varieties, is rendered probable by the existence of an intermediate form, which unites the characters of the others, and has been registered under the name of *Quer'cus interme'dia.*

American oaks are represented in our shrubberies and arboretums to the number of about 40 species; and European and Asiatic ones to the number of about 20. But very few are common, and only three or four are of every-day occurrence. They can never be confounded with any other trees. The indentation of the leaves, found in most, is entirely their own; and those species which do not afford this character, present the absolute and universal one of the Acorn,—a form of fruit which though greatly diversified in size and contour, is always unmistakeable, and without a parallel. Classified in the first place by their leaves, all kinds of oak are resolvable into two great sections,—those with lobed and sinuated leaves, and those in which they are undivided. The former, called oaks by way of pre-eminence, comprise three great races, the heads and representatives of which are the common British oak or *Quer'cus Ro'bur*, (including both the *peduncula'ta* and the *sessiliflo'ra*) the Turkey oak or *Quer'cus Cer'ris*, and the Red American oak or *Quer'cus ru'bra*. The second section, marked by the leaves being undivided, contains the common evergreen oak or *Quer'cus I'lex*, the cork-tree or *Quer'cus Su'ber*, the willow oak or *Quer'cus Phel'los*, and many others, chiefly evergreen, and, except when covered with their acorns, presenting little of the general appearance of oaks, as judged of from the common British one. In spring, the young branches are for the most part loaded with yellowish-green male catkins; the female flowers are always minute and hardly discoverable.

Of the first section the commonest is the *Quer'cus Cer'ris*, easily told by its hard and dry leaves, deeply and irregularly pinnatifid, and often so much narrowed in the middle as to be almost lyrate. The cup of the acorn, instead of being simply rough with tubercles, is mossy with long coarse bracts. Some varieties of this are deciduous, others evergreen, or nearly so. *Quer'cus ru'bra*, the Red American oak, is valued for the fine colour assumed by the foliage at the close of the season. The leaves are 6 inches long by 2 in width where broadest; the lobes ending in bristly points: the acorn-cups are large and remarkably flat. In *Quer'cus coccin'ea* the leaves are even larger, and the autumnal tint is much richer and brighter, the red of the *ru'bra* being brownish, whereas that of the *coccin'ea* approaches crimson. The common evergreen oak or *Quer'cus I'lex*, universal in shrubberies, is identified at a glance by its lanceolate and dark-green leaves, 3 or 4 inches long.

leathery in texture, and except when quite young, or recently moistened by the rain, always with a dusty and overworn look, not unlike that of the olive, as seen in the south of Europe. The acorns are not larger than hazel-nuts. The cork-tree is in appearance not unlike a broad-leaved *Quer'cus I'lex*, but distinguished by its bark. In the true *Quer'cus Su'ber* the acorns become ripe in 4 or 5 months; in the *Quer'cus occidenta'lis*, on the other hand, which often passes for the *Su'ber*, they require for their maturation more than a year. Near Cork there is a very fine and celebrated old tree of the latter species, with a trunk a yard in diameter. The true *Su'ber* is rare, being rather too tender for this climate. Other species, which though rare, may be met with now and then, are the Valonia-oak or *Quer'cus Æ'gilops* (the great acorn-cups of which lie in heaps in every tan-yard); the white American or *Q. al'ba*, the Italian or *Q. Es'culus*, and the willow-oak or *Q. Phel'los*—the least beautiful of the genus. For anything besides these we must go to Botanic Gardens and arboretums. Varieties of all the principal species are as common as the normal forms, many of them exceedingly beautiful, as for instance the variety *pic'ta* of the English *Ro'bur*, the leaves of which are marbled with pink and white. A variety with the leaves simply marbled with white is also frequent, and another with the branches pendulous. "Durmast oaks" are varieties of the *Ro'bur* in which the acorns are of a "dun" colour.

Of other Corylaceæ grown for ornament, additional to the British ones above-named, including their fine and singular varieties, coloured, weeping, fastigiate, &c., there are but few. The Hop-hornbeam, *Os'trya vulga'ris*, a native of Italy and other parts of the south of Europe, resembles the common hornbeam in its foliage, but is distinguished by the catkins of female flowers, which, when ripe, resemble the coniform catkins of the female hop. The Constantinople hazel or *Cor'ylus Colur'na*, a native of Turkey and Asia Minor, differs obviously from all varieties of the *Avella'na* in having a double husk to the nut, and in the extremities of the former being much lobed and fringed.

CXLIV. THE BIRCH-TREE FAMILY.—*Betula'ceæ.*

In the *Betula'ceæ* are comprised the various species of Birch and Alder, amounting perhaps in all to between 60 and 70. They are diffused throughout the woods of Europe, northern Asia, the Himalayahs, and North America; and make their appearance even upon the mountains of Peru and Columbia, and in the antarctic regions. Those found in the last-named latitudes are often diminutive shrubs, but the greater portion attain the stature and bulk of timber-trees. Such as occur in Britain, both wild and planted, are valued, however, principally for their ornamental effect in landscape. The special botanical character of the family is, that in the female flowers the ovary is free within the perianth and 2-celled, each of the cells containing a solitary and minute seed, though one is often abortive. The male catkins are long and pendulous, and underneath the scales of those of the Alders there are small bracts, which usually form three distinct and nearly regular 4-cleft perianths. The fruit consists, in both genera, of the enlarged and ripened female catkins. The leaves are simple, undivided, petiolate, and feather-veined.

Three grow wild in Britain.

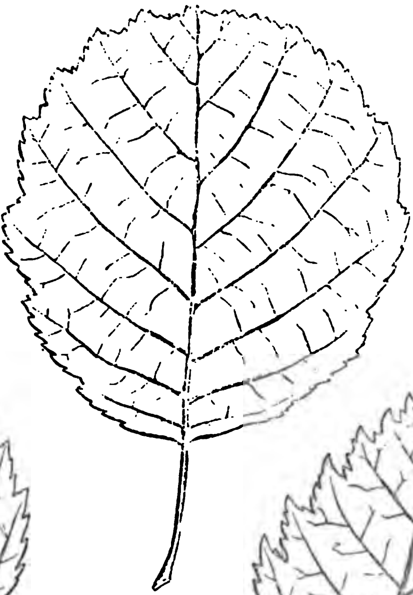

Fig. 176.
Alder.

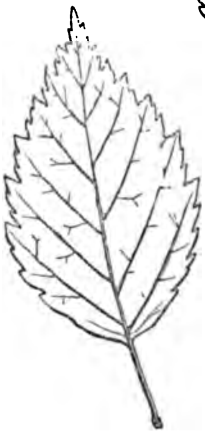

Fig. 175.
Birch.

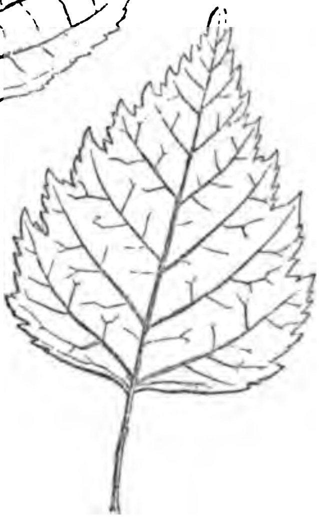

Fig. 177.
Birch.

1. Usually seen as a low shrub, but capable of attaining the height of 20 feet. Leaves always nearly circular, destitute of point, seldom more than half an inch across, crenate and beautifully veined. Catkins small and sessile; the females scarcely more than a quarter of an inch in length, and when ripe not readily falling to pieces. **Dwarf Birch.**

2. A forest-tree, attaining, when full-grown, the height of 50 feet, the disposition of the slender branches extremely light and graceful, and the bark silvery white, so as to be distinguishable as far as the eye can reach. Twigs remarkably slender, and in some varieties drooping for nearly their whole length, and waving with the slightest breath of air. Leaves varying from triangular to ovate or cordate, 1—2 inches broad where widest, unequally serrate, pointed, supported on long petioles, glabrous, shining, and deciduous. Male flowers in cylindrical catkins, which, while quite young, form short V's at the ends of the twigs; afterwards becoming pendulous, nearly 2 inches long, and light-brown, with 8—12 stamens under every scale. Female flowers in compact greenish catkins that usually stand erect, and are rarely an inch in length, and appear, in company with the male ones, cotemporaneously with the young leaves. Fruit consisting of the enlarged female catkins, which, when ripe, break up into innumerable little 3-lobed scales, every scale accompanied by a small, flat, and winged seed, COMMON BIRCH.

3. A tree of inconsiderable stature, dark and rugged in aspect, with crooked and spreading branches, and by no means picturesque if looked at too near. When the trunk has in any part been laid bare, or deprived of its bark, exposure to the atmosphere for a little while causes it to assume in that part a peculiar and characteristic red colour. Leaves large, broadly-ovate or roundish, very blunt at the upper extremity, sharply-toothed, stalked, glabrous, and deciduous. When young, they are glutinous. Male catkins 2 inches or more in length, deep reddish-brown, pendulous, growing 2—4 together on terminal and branched peduncles, and very conspicuous from their size and deep colour. Female catkins not more than half an inch long, and seated close to the males, both kinds appearing before the leaves come out; subsequently, or while ripening, oval, dark-green, and solid, like young fir-cones; eventually brown, hard, and woody, the scales separating (but not falling from the axis), and allowing the wingless seeds to escape. The clusters of black and emptied relics usually hang upon the trees throughout the winter, and often until the following summer. The new males appear in September, like those of the hazel-nut, but not so conspicuously. COMMON ALDER.

HABITATS AND DISTRIBUTION.

1. DWARF BIRCH—*Bet'ula na'na.*

Moors and spongy peat-bogs. In the Highlands of Scotland, common; in the north of England occasionally; in Ireland unknown. Fl. April, May.

E. B. xxxiii. 2326.

2. COMMON BIRCH—*Bet'ula al'ba.*

Hedgerows, woods, and plantations, universally, but where truly wild, almost impossible to say, unless when growing in remote places among the mountains. In gardens and plantations the variety *pen'dula* is the most frequent. Fl. April, May.

E. B. xxxi. 2198 (the upper figure); Baxter, v. 326.

By reason of the extreme delicacy of its general figure, and the long and swaying twigs, which depend like ringlets, the poets call this graceful tree "the lady of the woods." In individuals of considerable age the bark splits into deep, wide fissures, the continuity of white covering is broken, and the fissures seem almost black. In young trees the epidermis is prone to peel off transversely. When full grown, the birch is subject to a curious morbid affection which causes dense tufts of twigs to grow out every here and there upon the branches, sometimes to the number of fifty or more on a single tree. During the summer these tufts are concealed by the foliage, but in winter, when the tree is leafless, they show conspicuously, and look like obsolete rooks' nests. In Scotland they are termed "witches' knots." Young trees, viewed in the winter, and from a distance, especially if mingled with dark ones or with evergreens, present in their cold thin whiteness a spectral appearance that is quite unique. Seedling birches are even more numerous than young beeches, and in woods sometimes grow so thickly as to form a herbage of themselves. That the birch is one of the aboriginal trees of our island is shown in a very interesting manner in the great peat-bogs of the north, and nowhere more conclusively than in those near Manchester. When the peat is removed, during the process of drainage, immense quantities of fragments of branches and twigs are found embedded in the lower strata, with the silvery bark still adhering, and as bright as when it grew, though the age must be 1,500 or 2,000 years. Besides the fragments of branches, at Lindow there are found great pieces of the main trunks. (See "Manchester Walks and Wild-flowers," pp. 99—103.)

"*Bet'ula glutino'sa*," otherwise "*Bet'ula pubes'cens*," is distinguished by Mr. Babington and some other botanists as "a tree not so elegant as the preceding, often little more than a bush, with the leaves always more or less ovate instead of rhomboid or triangular, the stipules deflexed instead of circinate, and the catkin-scales ovate and rounded instead of elongated and tapering—E. B. xxxi. 2198 the lower figure. Common."

3. COMMON ALDER—*Al'nus glutino'sa.*

Wet and swampy places, borders of ponds and rivers, and in damp cloughs, everywhere; forming, like the willow, a characteristic adjunct of the water-side. It will grow, however, in dry places, and even by dusty waysides; but its delight is in wet, and very wet land, such as the edges of running brooks, especially where the water breaks out and steeps the soil. Fl. March, April—in fine seasons as early as January.

Curtis, iii. 550; E. B. xxi. 1508 (as *Bet'ula Al'nus*); Baxter, iii. 103.

In January and February, when hung with its incipient brown catkins, the alder is already a remarkable tree; later, when the catkins are expanded, it is striking and very curious; in September it becomes still more so, since at that time we may generally find upon it the signs of three successive years. The black and empty seed-catkins of 12 months before still hang upon the twigs; the green and ripening ones and the leaves of the current season, stand alongside of them; and young catkins, both male and female, preparing for the spring to follow, are almost as plentiful. A variety has the leaves deeply incised.

CXLV. THE POPLAR FAMILY.—*Salica'ceæ.*

Like the Birch-family, this very interesting group of trees comprises no more than two genera, viz., *Pop'ulus*, in which are included poplars of all kinds, and *Sa'lix*, to which belong the willows, the sallows, and the osier. Their racemes of two-valved capsules, discharging abundance of little seeds covered with long white silky hairs, markedly distinguish them not only from the immediately related families, but from all others that have unisexual flowers. The only shrub at all resembling them among the bisexual families is the tamarisk, and even in that the sole point of agreement is the fruit and feathery seed. The leaves are alternate, simple, and undivided, in outline varying from narrow-lanceolate to triangular or circular, usually petiolate, serrate, and pointed, and with the veins "deliquescent," or spreading irregularly, as in Figs. 178, 179—in other words, never with parallel ribs extending from the midrib to the margin, as happens in the Oak and Birch families. In the poplars they usually have their long and slender petioles flattened at a right angle with the blade, whence arises the pretty quivering that has made a proverb of the aspen, in which species the movement is incessant. The catkins, both male and female, are in almost all

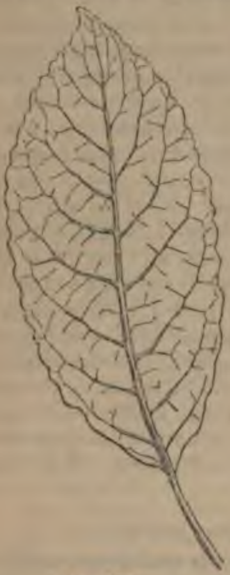

Fig. 178.
Common Sallow *(Sa'lix Capræ'a).*

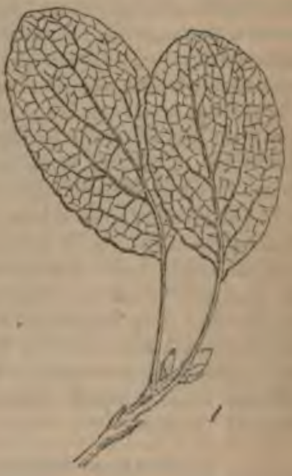

Fig. 179.
Highland Willow *(Sa'lix reticula'ta).*

cases "diœcious," or upon separate individuals. It happens, however, not infrequently, that male and female flowers are mingled in the same catkin, and in one species of willow, the *Sa'lix Hoppea'na*, this is the case almost invariably. The catkins are often large and handsome; those of several of the common species, particularly the sallows, contribute largely to the decoration of the woods and hedges, and at a season

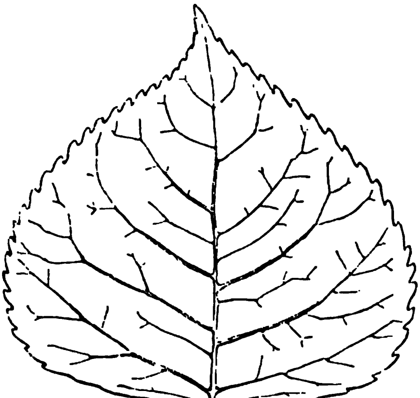

Fig. 181.
Black Poplar.

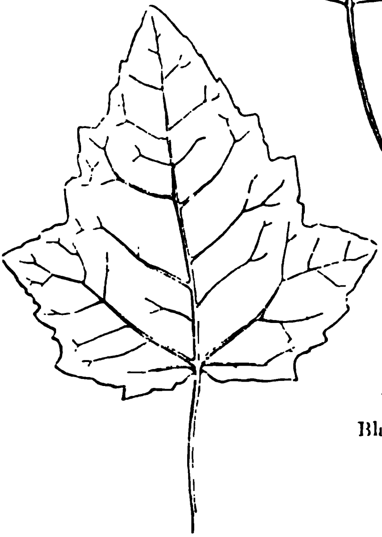

Fig. 180.
White Poplar.

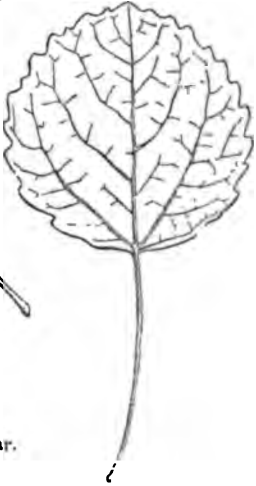

Fig. 182.
Aspen.

when there is little else to be seen. For the most part they appear before the leaves, but in a few the flowers are cotemporaneous with the first foliage. Later on, the female catkins become very conspicuous, from the copiousness and whiteness of the cottony appendages to the innumerable seeds, though much of this cotton belongs to ovules that, having received no pollen, could not come to maturity. The female catkins of the poplars, when full-blown and ready to burst, resemble long racemes of green currants, and when their contents have been cast out, the ground beneath is as white as if snowed upon. The toughness of the stems of willows is proverbial. How often it happens when attempting to gather a twig, that, with all our tugging, we merely strip off the bark and leaves, which gather up in the hand in an unexpected coil.

Both the poplars and the willows are valuable, either as timber-trees, or for miscellaneous economic purposes. The use of osiers for basket-making, and of sallow-wood for the manufacture of charcoal, is well known. Both also are natives of much the same districts, spreading, like the members of the Oak and Birch families, over the whole of the temperate parts of the northern hemisphere. These, however, extend even further towards the pole. The most northern woody plants known are the two little willows called *Sa'lix arc'tica* and *Sa'lix pola'ris.*

Concerning the number of species there is much difference of opinion. A very considerable list has been made out, but of poplars there are in this country probably not more than three true species wild, and one true exotic species--four in all,—though fifteen or more are distinguished in catalogues; while of the 150 or 200 reported species of willow, a very large portion are unquestionably suppositious. Smith, in the "English Flora," and Hooker, in the "British Flora," reckon that there are of British willows alone no less than 70. Lindley, in the second edition of his "Synopsis," following the arrangement of the German botanist Koch, reduces the number to 30. Mr. Babington, in his "Manual," Ed. 5, reckons them as 31. Mr. Bentham, in his "Handbook," as 15. The last is likely to be the soundest estimate, and that which I adopt in the present volume, satisfied that the really different forms of nature are very much fewer than is commonly supposed. Whether the other 55 be "varieties" or "hybrids," in the present state of our knowledge no one can say. It is true that from the exposed position of the female flowers, the copiousness of the pollen yielded by the male ones, and the activity of the bees, there is apparently great facility for hybridism, but until it can be shown by direct experiment that hybrids arise, it is quite as reasonable to consider them as "varieties." In any case the study of the willows must needs always be very difficult. The great variation in the forms of the leaves of certain kinds; the difficulty of matching the males and females, since they very rarely grow in company; and the further difficulty of matching the foliage and the flowers of those that bloom before the leaves are open, are circumstances that delay and perplex even the most experienced. Unless marked in some way (as with a bit of coloured ribbon tied round one of the branches), and leaves be gathered, when ready, from the same individual, it is utterly impossible to know anything accurate about them. In searching for examples in the woods and fields it must be remembered further that, since all willows and poplars are diœcious, it is quite likely that in certain districts there may be no males of particular species, or if there be plenty of males, that there may be no females, and *vice versâ*, or that individuals of either sex may be extremely rare. Experience proves it to be so. No local Flora is able to furnish complete knowledge of more than a few prominent and unmistakeable forms, and hence it becomes necessary to study these plants in Botanic Gardens. In the following pages I have cited the E. B. figures of the whole of the reputed 70, with the exception of

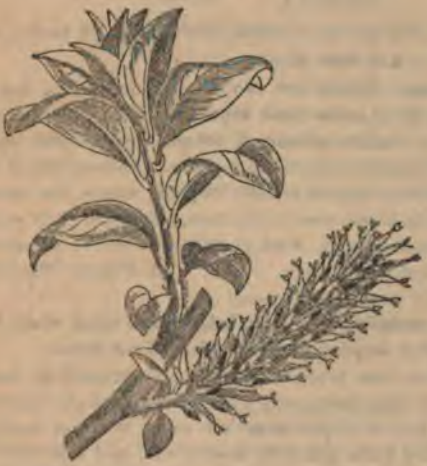

Fig. 183.
Willow (female catkins).

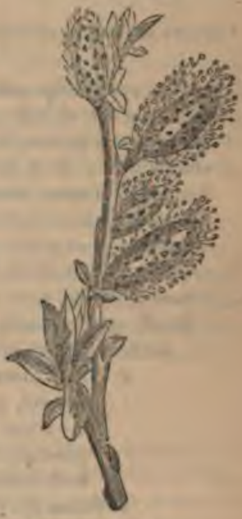

Fig. 184.
Willow (male catkins).

petiola'ris and *malifo'lia* (xvi. 1147; xxiii. 1617.) which are said, by later authorities, not to be British.

Taking them in the aggregate, the distinctions between the willows and poplars are as follow:—

I. Willows—Stamens 2, rarely 3 or 5. Scales of the catkins entire. Leaves usually narrow, sometimes ovate or roundish, and generally motionless.

II. Poplars—Stamens 6—8—12. Scales of the catkins torn and ragged.—Leaves always broad, generally angular, and usually quivering.

I.—WILLOWS AND OSIERS.

Section 1.

Catkins appearing before the leaves, lateral, and sessile, or nearly so.

A.—*Male plants.*

A. *Stamens apparently solitary.* (There are two stamens in reality, but the filaments are united, so as to make them appear but one. The anther is consequently quadruple.) Catkins cylindrical, obtuse, very compact, downy, closely sessile along the twigs, and generally opposite. Anthers purple after flowering. Leaves, when they appear, usually long and narrow, but variable in width, broadest upwards, linear towards the base, pointed, slightly serrate, smooth, and of a fine green colour. Bark glossy, often yellow, or purplish, or coral-red. A shrub 6—8 feet high. 6. Purple Willow.

B. *Stamens distinctly two.*

- * Small shrubs, rarely exceeding 2 feet in height, and often much less; anthers yellowish when emptied of their pollen, if not before.
  - *a.* Stems more or less procumbent, creeping extensively underground, and often rising only a few inches, though sometimes 1—2 feet. Leaves elliptic-lanceolate, acute, entire, or nearly so, generally very white and silky underneath, and sometimes on both surfaces. 10. Common Creeping Willow.
  - *b.* Stems not creeping underground.
    - Catkins about an inch long, white and silky. Leaves, when they appear, oblong or lanceolate, entire, pointed, and, while young, downy on both surfaces. 11. Downy Willow.
    - Catkins fine golden-yellow, larger than in the preceding, and covered with long silky hairs. Leaves, when they appear, usually ovate, and clothed on both surfaces with soft and silky wool. 12. Woolly Willow.
- ** Small trees or large shrubs, with an obvious trunk. Anthers becoming yellowish-brown after flowering. Catkins with bracteas at the base.
  - † Branches very long, straight, round, slender, wand-like and pliant. Catkins cylindrical, with rather long silky hairs. Leaves, when they appear, narrow-lanceolate, often 4—5 inches long, obscurely crenate, white underneath with copious silky down; the edges, before they open, rolled back., 6. Common Osier.

(CATKINS APPEARING BEFORE THE LEAVES. *Male plants. Stamens distinctly two.* Small trees or large shrubs with an obvious trunk.)

†† Branches spreading.

a. When not stunted in hedges, a tree of 10—30 feet in height. Catkins golden-yellow, broadly egg-shaped, 1—2 inches long, often an inch in diameter, silky with long hairs, numerous, conspicuous, and very showy. Leaves, when they appear, ovate-elliptical, acute, serrate, a little wrinkled, glabrous above, cottony and very veiny beneath, but not silky. Stipules small, and usually only upon the upper leaves. 7. COMMON SALLOW.

b. Bushy shrubs.

Catkins ½—¾ of an inch long, half an inch in diameter, closely sessile on the twigs, and with very few and short silky hairs. Leaves, when they appear, obovate, much wrinkled and curled, tipped with a small curved point, gray and downy, especially on the under side. Stipules very large, conspicuous and characteristic. 8. EAR-LEAVED SALLOW.

Catkins slender, nearly sessile, and not remarkably silky. Leaves, when they appear, varying from ovate-oblong to lanceolate, pointed, not wrinkled, though veiny on the upper surface, often serrate, and usually whitish underneath. 9. TEA-LEAVED WILLOW.

B.—*Female plants.*

A. Stems creeping extensively underground, and rising 6—12—24 inches above the surface. Ovaries on long stalks, lanceolate, very silky, and often reddish. Leaves, when they appear, elliptic-lanceolate, acute, entire, or nearly so, generally very white and silky underneath, and sometimes silky on both surfaces. 10. COMMON CREEPING WILLOW.

B. Plant not creeping underground. Stem and branches erect or spreading.

* Tall shrub. Branches very long, straight, slender, wand-like, and pliant. Leaves, when they appear, linear-lanceolate, often 4—5 inches long, obscurely-crenate, white underneath with copious silky down; the edges revolute while young. Styles very long. Capsules downy and tapering. 6. COMMON OSIER.

** Branches spreading, not wand-like.

a. Ovaries very obtuse, oblong-ovoid, usually sessile, and cottony-white. Catkins very compact. Leaves, when they appear, usually long and narrow, but variable in width, broader upwards, pointed, slightly serrate, smooth, and of a fine green colour. Bark glossy, often yellow, or purplish, or coral-red. Styles scarcely any. Tall shrub, or small tree. 5. PURPLE WILLOW.

elliptical, acute, serrate, a little
cottony and very veiny beneath,
small, and usually confined to th
stunted in hedges, 10—30 feet hi

Bracts on the peduncles few. Catki
long. Leaves, when they appea
and curled, tipped with a smal
downy, especially on the under
conspicuous and characteristic.
8

c. Ovaries tapering, sessile, and cottony. Lo
ing shrubs.

Ripe catkins 1½—2 inches long. Le
entire and pointed, and, whil
surfaces.

Ripe catkins nearly 3 inches long.
densely clothed on both surfaces

SECTION 2.

CATKINS AND YOUNG LEAVES COTEMPORANEOUS—THE F

A.—*Male plants.*

A. Stamens five. Catkins numerous, large and hand
more or less upright, yellow and fragrant, and ter
the year. Leaves elliptic-lanceolate, acute, serrat
glabrous, and exuding an aromatic odour from
the edges. A shrub or small tree 6—12 feet high
1. SWE

B. Stamens three. Catkins conical at first, cylindrica
inches long, bright yellow, and fragrant. Leav
glabrous, white underneath, but not silky, and

(Catkins and young leaves cotemporaneous. *Male plants.* Stamens two. Trees.)

Leaves ovate-lanceolate, 4—5 inches long, acute, finely serrate, glabrous, dark green, and shining on the upper surface.
2. Common Crack Willow.

** Small shrubs, sometimes prostrate on the ground. Catkins at the ends of short leafy shoots, without buds.

Catkins nearly sessile. Leaves slightly toothed, ovate-oblong or lanceolate, pointed, not wrinkled, though veiny above, and usually whitish underneath. 9. Tea-leaved Willow.

Catkins upon leafy stalks. Leaves finely toothed, small, usually ovate or almost circular, sometimes narrow, bright green, with prominent veins, usually silky while young, glabrous afterwards.
13. Whortle Willow.

*** Diminutive shrubs, with prostrate or creeping stems; the catkins on short leafless peduncles at the last leaf of a branch, with a bud in the angle.

Leaves quite entire, wrinkled, obovate or nearly circular, white underneath, green and glabrous above. Branches seldom rising more than 5—6 inches above the ground. Catkins cylindrical. 14. Highland Willow.

Leaves finely toothed, not wrinkled, green on both sides, obovate or nearly circular, and about half an inch long. Branches creeping below and seldom rising more than 2 inches above the ground. Catkins ovoid and few-flowered.
15. Dwarf Mountain Willow.

B.—*Female plants.*

A. Trees or tall shrubs.

a. Leaves green on both sides, and glabrous, or nearly so.

Shrub or small tree, 6—12 feet high, with aromatic foliage. Leaves broadly-lanceolate, acute and serrate, with minute black glands along the edges. Ovaries glabrous, yellowish-green.
1. Sweet Bay-leaved Willow.

Large tree, with scentless foliage. Leaves narrow-lanceolate, 4—5 inches long, acute, finely-serrate, shining on the upper surface. Ovaries pedicellate, and very tapering. 2. Common Crack Willow.

b. Large tree. Leaves white on both sides (sometimes glabrous when old, but never bright-green), lanceolate, serrate, acute, and several inches long. Ovaries glabrous and sessile, or nearly so.
3. Common White Willow.

c. Tall shrub. Branches very long, straight, round, slender, wand-like, and pliant. Leaves narrow-lanceolate, 4—5 inches long when full grown, obscurely crenate, revolute while young. Style very long. Capsules downy and tapering. 6. Common Osier.

d. Shrub or small tree, 6—8 feet high, the branches spreading. Leaves green above, white underneath, but not silky, oblong-lanceolate, acute, serrate, and glabrous. Ovaries glabrous, usually pedicellate, and tapering but slightly. 4. Smooth Willow.

Ovaries on pedicels. Leaves slightly s

Ovaries almost sessile. Leaves finely
or roundish, bright green, with pr

II.—POPLARS.

A. A tall and handsome tree, rising 40—50 feet hig
and smooth, light-gray or ash-coloured bark, th
white and cottony down. Leaves petiolate, in c
triangular, but usually so deeply toothed on each
the upper surface very dark-green, glabrous, a
surface closely covered, like the young shoots
renders it remarkably white. Catkins large, se
long; the male ones with about eight stamens u
hairy scales; the females with four stigmas, th
Numerous suckers usually arise from the base
are generally fluttering. Buds not clammy.

B. A large and leafy tree, of very rapid growth, much
but not picturesquely, and perfectly glabrous in
triangular (the lower angles rounded, the upper
glabrous on both surfaces, and often twice as long
flattened petioles. Catkins lax and pendulous, tl
brown, partly crimson while young, appearing b
almost confined to the top of the tree; the sc
sixteen stamens underneath them, hairy only a
the base of the trunk. Foliage copper-coloured
in the adult state, usually fluttering. Buds ver

HABITATS AND DISTRIBUTION.

1. SWEET BAY-LEAVED WILLOW—*Sa'lix pentan'dra.*

Borders of ponds, banks of rivers, and wayside hedges, where the soil is rather damp; chiefly in the north of England and the south of Scotland. Found also in Ireland. Common about Manchester. Fl. end of May and beginning of June.

E. B. xxvi. 1805.

The handsomest of the shrubby English willows, the large and abundant yellow catkins contrasting most agreeably with the copious and shining foliage, which has the look of some fine evergreen rather than that of a plant that annually sheds its leaves. In warm weather both leaves and catkins exhale a delicious aromatic perfume resembling the odour of the Balsam-poplar, that of the leaves proceeding from glands in the serratures, which in young ones seem beaded with moisture. This beautiful shrub grows readily from cuttings, and will make itself at home in the dry soil of town gardens.

2. COMMON CRACK WILLOW—*Sa'lix fra'gilis.*

Banks of rivers, low moist ground, and roadsides; common everywhere, and very generally planted for ornament. Fl. May.

E. B. xxvi. 1807.

A large and bushy tree; generally distinguished, *par excellence*, as "the Willow." It is remarkable for the crookedness of its branches, which while young, readily snap off at the base, a peculiarity adverted to in the name *fragilis*. The red fleshy excrescences often seen upon the leaves (and upon those of many other willows) are galls produced by a small species of saw-fly, the grub of which may be found inside. The "Bedford Willow," or *Sa'lix Russelia'na* (E. B. xxvi. 1808.) is a form of this species with narrower leaves, glaucous beneath, and rather coarsely serrated. *Sa'lix decip'iens* (E. B. xxvii. 1937.) is another form, with highly-polished and reddish-brown branches, the young shoots often crimson.

3. COMMON WHITE WILLOW—*Sa'lix al'ba.*

River-banks, and in moist and swampy places; common all over Britain, both wild and planted. Fl. May.

E. B. xxxiv. 2430.

The silvery gray of the foliage, caused by the close-pressed silky-hairs, renders this tree remarkable, and conspicuous from a long distance, and when, as often happens, it fringes rivers, enables us to trace their course across the country, a circumstance ingeniously made use of by painters of landscape. The peculiar colour, and the plume-like character of the branches, give it also an air of lightness and grace which wonderfully adds to the beauty of scenery, the contrast with trees of deeper tint producing an effect at once singular and agreeable. This and the *Sa'lix fra'gilis* are the two largest of the genus. To the *al'ba* are referable the golden osier, or *Sa'lix vitelli'na*, (E. B. xx. 1389.) so called from its bright-yellow branches; and the *Sa'lix cœru'lea*, (E. B. xxxiv. 2431.) remarkable for the silvery-blue shade of the foliage.

4. Smooth Willow—*Sa'lix trian'dra.*

Wet woods, pondsides, and osier-grounds; widely distributed, but not very common. Fl. May.

Curtis, ii. 436; E. B. xx. 435.

In this species it appears legitimate to sink the *Sa'lix lanceola'ta* (E. B. xx. 1436.) the *Sa'lix amygdali'na*, (xxvii. 1636.) and the *Sa'lix Hoffmannia'na* (Supp. i. 2620.) which last is the *trian'dra* of Curtis, as above cited.

5. Purple Willow—*Sa'lix monan'dra.*

Banks of rivers and marshy places; common in most parts, as far as the south of Scotland, and not infrequently planted in osier-beds. Fl. February—April.

Curtis, ii. 435; E. B. xix. 1343 (as *Sa'lix He'lix); Baxter, vi. 434 (as *S. purpu'rea).*

Includes, according to Mr. Bentham, the forms called by authors *ru'bra*, (E. B. xvi. 1145.) *Forbya'na*, (xix. 1344.) *Lambertia'na*, (xix. 1359.) and *purpu'rea*, (xx. 1388.) by the last of which names he designates the whole group. Mr. Babington adds *Sa'lix Woolgaria'na* (Supp. i. 2651.)

6. Common Osier—*Sa'lix vimina'lis.*

Wet places, by streams, and in osier-grounds, or as they are called in Cheshire, "twig-beds;" common everywhere, and forming the chief source of supply to the basket-maker. Fl. April, May.

E. B. xxvii. 1898.

Sa'lix Smithia'na or *mollis'sima* (E. B. xxi. 1509.) is a variety of this species, with hairy and rather broader leaves and the capsules more distinctly pedicellate. *Sa'lix stipula'ris* (xvii. 1214.) also belongs to it; and probably *Sa'lix ferrugin'ea* (Supp. i. 2665.)

7. Common Sallow—*Sa'lix Capra'a.*

Woods, pondsides, and damp hedges; common everywhere. Fl. April, May, and when the winter is mild, as early as January.

E. B. xxi. 1488.

The first of our native willows to come in bloom, and in every way a pretty and interesting shrub. The large golden-yellow male catkins, and the silvery-gray females, deck the bare branches in the most beautiful manner, rendering the trees conspicuous objects in early spring, and giving plenty of work to the little citizens of the bee-hive, who visit them alternately with the crocuses in the garden. Later in the season, when the leaves are out, the matured ovaries pour forth a profusion of silky seeds, or at least of the silky appendages of more or less perfected ovules, and make the branches look as if hung with locks of wool. The young buds, with the enclosed catkins, are often developed in October, and the white silk often bursts through, while the leaves of the current season are still green,—a striking illustration of the sublime but little-noticed fact that what we call Spring really begins in autumn, the phenomena of March and April being only the completion of a long series of preparations. The actual beginnings of things are rarely or never beheld. In nature we can never get far enough back; everything that seems a beginning is still only a result. (See "Life, its Nature, Varieties, and Phenomena," chap. xx. Ed. 2.)

Along with the other early willows, the sallow is commonly called "palm," and is used by the Roman Catholics of England in their Palm-Sunday ceremonials.

> In Rome, upon Palm-Sunday,
> They bear true palms,
> The cardinals bow reverently,
> And sing old psalms.
> Elsewhere those psalms are sung
> Beneath the olive-branches;
> The holly-bough supplies their place
> Amid the avalanches.
> More northern climes must be content —

not exactly "with the *sad* willow" as the poet goes on to say, for that is the *Sa'lix Babylo'nica*, or weeping-willow, a plant not used in Catholic ceremonies, whereas this one, which he intends, is an emblem of hope and cheerfulness. It is the same as that which Rosalind "found in the wood."

The variation in the shape, size, and surface of the leaves of the Sallow is considerable, and many supposed species have in consequence been made out of it. Of these, the chief are—The olive-leaved sallow, (*Sa'lix oleæfo'lia*, E. B. xx. 1402.) the water sallow, (*Sa'lix aquat'ica*, xx. 1437.) and the gray sallow (*Sa'lix cine'rea*, xxvii. 1897.); all growing in wet hedgerows, and by pondsides, and appearing to pass insensibly into one another. Besides these three, it is probable that under the same name should be placed *Sa'lix acumina'ta* (xx. 1434.) and *Sa'lix sphacela'ta* (xxxiii. 2333.)

8. Ear-leaved Sallow—*Sa'lix auri'ta.*

Moist woods and thickets, damp hedgerows, and pondsides; abundant everywhere. Fl. end of April and beginning of May.

E. B. xxi. 1487.

9. Tea-leaved Willow—*Sa'lix phylicifo'lia.*

Moist woods and thickets, and in low wet places. Common, in its many varieties, in the north of England, and in Scotland. In Ireland less frequent. Fl. April, May.

E. B. xxviii. 1958.

To this multiform species are referred, by Mr. Babington, no less than nine of those distinguished and figured in E. B., viz.:—*Sa'lix Crowea'na*, (xvi. 1146.) *Dicksonia'na*, (xx. 1390.) *Borreria'na*, (Supp. i. 2619.) *ni'tens*, (Supp. i. 2655.) *Weigelia'na*, (Supp. i. 2656.) *phillyreifo'lia*, (Supp. i. 2660.) *Davallia'na*, (Supp. ii. 2701.) *tetra'pla*, (Supp. ii. 2702.) and *laxiflo'ra* (Supp. ii. 2749.) The foliage of these nine is ordinarily small and neat, and, when dried, retains its green colour pretty well. A second set of E. B. species, sunk by Mr. Bentham in *phylicifo'lia*, but which Mr. Babington keeps apart under the collective name of *ni'gricans*, and which always turn black in drying, comprises *ni'gricans*, (xvii. 1213.) *cotinifo'lia*, (xx. 1403.) *hir'ta*, (xx. 1404.) *rupes'tris*, (xxxiii. 2342.) *Andersonia'na*, (xxxiii. 2343.) *Forsteria'na*, (xxxiii. 2344.) *damasce'na*, (Supp. ii. 2709.) and *petræ'a* (Supp. ii. 2725.) A third set, not noticed by Mr. Bentham, is placed by Mr. Babington alongside of his *phylicifo'lia*, with which they agree in retaining their green colour when dried. These are *bi'color*, (xxvi. 1806.) *tenu'ior*, (Supp. i. 2650.) and *propin'qua* (Supp. ii. 2729.) Twenty in all, with *rosmarinifo'lia*, (xix. 1365.) *tenuifo'lia*, (xxxi. 2186.) and probably *Donia'na*, (Supp. i. 2599.) to be added!

10. COMMON CREEPING WILLOW—*Sa'lix re'pens.*

Heathy and sandy places, both inland and by the sea, though chiefly the latter; common in most parts of Britain. Extremely abundant on the sandhills of the coast of Lancashire, from Liverpool northwards, forming in many places a dense and scrubby mat. Fl. May, June.

E. B. iii. 183.

Varieties of greater or less luxuriance and silkiness of foliage, are registered in E. B. under the names of *argen'tea*, (xix. 1364.) *arbus'cula*, (xix. 1366.) *prostra'ta*, (xxviii. 1959.) *fus'ca*, (xxviii. 1960.) *parvifo'lia*, (xxviii. 1961.) *adscen'dens*, (xxviii. 1962.) and *incuba'cea* (Supp. i. 2600.) In addition to these there is a dubious plant called *Sa'lix ambig'ua* (Supp. ii. 2733.) which some think is a hybrid between *re'pens* and *auri'ta*. Total of names, nine.

11. DOWNY WILLOW—*Sa'lix Lappo'num.*

Mountainous pastures in the Highlands of Scotland. Breadalbane and Clova mountains. Fl. June, July.

Includes, according to current views, the *Sa'lix arena'ria* of E. B. xxvi. 1809, the *glau'ca*, xxvi. 1810, and the *Stuartia'na*, xxxvi. 2586.

12. WOOLLY WILLOW—*Sa'lix lana'ta.*

Occurs only in a few rocky glens in the Clova and Glen Lochay mountains, Highlands of Scotland. Fl. May, June.

E. B. Supp. i. 2624.

13. WHORTLE WILLOW—*Sa'lix Myrsini'tes.*

Lofty mountains of Scotland and Ireland; not uncommon. Fl. June.

E. B. xix. 1360, and Supp. ii. 2753, as *Sa'lix procum'bens.*

Probably includes, according to Mr. Bentham, the E. B. *prunifo'lia*, xix. 1361, *venulo'sa*, xix. 1362, *carina'ta*, xix. 1363, and *vacciniifo'lia*, xxxiii. 2341.

14. HIGHLAND WILLOW—*Sa'lix reticula'ta.*

Mountains in the Highlands of Scotland; rare. Fl. June.

E. B. xxvii. 1908.

15. DWARF MOUNTAIN WILLOW—*Sa'lix herba'cea.*

Mountains of Scotland, the north of England, Wales, and Ireland, at considerable elevations. Ingleborough. Scawfell. Fl. summer.

E. B. xxvii. 1907.

16. WHITE POPLAR—*Pop'ulus al'ba.*

Hedgerows and waysides, especially where damp, and more particularly in low wet places near rivers and by the sides of ponds. Very common, and though in many cases planted, undoubtedly a native of Britain. Fl. April, May.

E. B. xxi. 1487.

Authors commonly distinguish from this *Pop'ulus canes'cens* or the "gray poplar," (E. B. xxiii. 1619.) the characters of which consist in the smaller size of the leaves, their being seldom lobed (except on the suckers from the root, when they often exactly resemble those of the *al'ba)*, and in the under-surface being less white, and often merely gray. It would seem, however, that this "gray poplar" is the original form of the tree, and that the white poplar is the variety, and that the latter was originally brought from the continent—possibly from Flanders. The white poplar is rarely or never seen unequivocally wild; it is never a truly sylvestral tree; we always see it in situations where there is more or less sign of cultivation. *P. canes'cens*, on the other hand, is occasionally found in the recesses of damp woods, and fringing the forest-stream, where it may be reasonably believed truly indigenous. Both forms of the plant send out creeping roots to an immense distance, from which arise innumerable suckers, so that hedges become filled with a bushy undergrowth, and low wet meadows are converted into poplar-groves. Female individuals, as of our other native poplars, are extremely rare; we may examine many hundreds, and find all to be males.

17. BLACK POPLAR—*Pop'ulus ni'gra.*

Hedgerows and damp woods. Common, but so extensively planted, until latterly, that it is difficult to say what individuals may be truly wild. Fl. April.

E. B. xxvii. 1910; Baxter, vi. 506.

The deep-hued catkins give this tree a glowing and ruddy beauty in early spring such as no other of the Amentiferæ ever possess. They strew the ground in abundance after flowering, and at the same season there may be picked up thousands of delicate skeletons of the preceding year's leaves, deprived of their cuticle and cellular tissue by the action of the elements during winter. Like many of the willows, it runs into several different forms, some of which have at first sight, the aspect of "species," and have received specific names. First, there is the *Pop'ulus Canaden'sis*, admitted to be so near the original English *ni'gra* as to be very doubtfully distinct. Second, there is the "Black Italian," *Pop'ulus monilif'era* or *aclades'ca*, probably an improved variety of the *Canaden'sis*, and deriving its name from the necklace-like figure of the racemes of fruit. Third, there is the common Lombardy poplar, *Pop'ulus fastigia'ta* or *pyramida'lis*, distinguished by its peculiarly erect habit. There are no characters by which these four trees can be absolutely differentiated, and the "Black Italian" having in great measure superseded the old English *ni'gra* with planters,—completely so in some districts—it has come to be confounded with it, and has in part usurped the name. In physiognomy, however, these two last are quite unlike, and it may be added, also in timber, the wood of the old English *ni'gra* being tougher, a circumstance partly attributable to the tree being of slower growth than the *monilif'era*. Familiar as it now is, the Lombardy poplar was unknown in England till about a century ago, when cuttings or young trees were introduced from Turin. For picturesque effects it is a tree of peculiar value, since when judiciously introduced it gives a similar effect to that of spires and lofty columns in a city.

18. Aspen—*Pop'ulus trem'ula.*

Hedgerows, moist woods, waysides, and plantations, especially where the ground is moist; common. Fl. April.

E. B. xxviii. 1909.

The *Salica'ceæ* grown in gardens and shrubberies comprise a few of the indigenous species of willow, especially the *Sa'lix fra'gilis*, and more particularly the celebrated "weeping-willow" or *Sa'lix Babylo'nica*, of Asia, though this last is most usually left to the churchyard. Small exotic species with pendulous branches are also used occasionally as ornaments for lawns, but ordinarily the genus finds little favour except in Botanic Gardens and in spacious arboretums. This is reasonably to be expected from willows being mostly plants that prefer damp and even watery situations. The Londoner may inspect a fine collection on the margin and in the islands of the great sheet of ornamental water in the Victoria Park. Of exotic Poplars the chief is the common Lombardy, or *Pop'ulus fastigi'ata*, already mentioned,—that well-known, tall, and spire-like tree which is commonly spoken of as *the* poplar,—the only spire-like tree that casts its leaves in autumn, and the vertical branches of which rarely touch either one another or any neighbour. The balsam or Canada poplar *(Pop'ulus balsamif'era)*, now almost as frequent as the Lombardy, is distinguished by its great triangular leaves, and the powerful balsamic fragrance exhaled from the clammy buds. The yellow foliage is remarkable and conspicuous in early spring, especially when opposed to the pink blossoms of the almond;—the catkins of the female trees, filled with snow-white down, strew the ground, when they drop off, in immense quantities, and by the uninformed, are mistaken for cotton-pods. The petioles of this species are not flattened laterally, like those of the English poplars, so that the leaves do not tremble. *Pop'ulus can'dicans* or *macrophyl'la*, commonly called the "Ontario poplar," closely resembles the *balsamif'era*, but the leaves are three times larger, and cordate at the base, and the petioles, as usual in the genus, are compressed. In stature it is rarely more than half so tall. "Weeping" varieties of *canes'cens* and *trem'ula* are met with occasionally. Of *fastigi'ata* the examples are all or chiefly males.

CXLVI. THE WALNUT FAMILY.—*Jugланda'ceæ.*

A small family of noble trees, belonging almost exclusively to North America, though the common walnut, or *Ju'glans re'gia*, is a native of Persia and Cashmere. This delightful and precious tree is immediately distinguished from all others by the aromatic odour of its great pinnate leaves, formed of 5—9 leaflets, which are oval, glabrous, yellowish-green, and slightly serrated or nearly entire. It is one of the last to come in leaf, and is very soon dismantled again, being unable to withstand the autumnal frosts. The foliage, while young, and for some time, furnishes a fine contrast to that of other trees in the warmth of its hue. The male flowers are produced in large, green, handsome pendulous catkins; the females in sessile and terminal clusters of the same colour, both growing upon the same tree, appearing in company with the young foliage, and about the time of the blooming of the purple rhododendron. It is important to note, as the generic character, that the catkins are produced from buds upon shoots developed previously to the year in which the catkins appear, and that the stamens are numerous, say 18—36. The female flowers are tetramerous.

In the south of England the walnut is a very common tree, not only in pleasure-grounds and gardens, but by the wayside in retired villages, as at Tickenham, Somersetshire, and ripens its dainty fruit every year, freely and abundantly. In the north it is rather rare, and found chiefly near old halls, and other residences of note, and the fruit cannot be depended upon. Raised from seed, it begins to bear at ten years' old, and every year, as it approaches maturity, it increases in productiveness. The tap-root is unusually strong, and gives the tree a powerful anchorage, so that it is less liable to be torn up by tempests than any other. There is good reason to believe that this tree has been in England since the time of the Romans, from whom it received the name of *Juglans* or "Jupiter's nut," in contradistinction to acorns and beech-mast. There is a beautiful but rather rare variety called *lacinia'ta*, in which the leaves are finely divided. Two or three others of the genus are sometimes cultivated for ornament, all of them with foliage resembling that of the familiar *re'gia*. The black-wooded walnut *(Ju'glans ni'gra)* has leaves 18 inches loug, formed of 13—17 leaflets, and fragrant, like those of the *re'gia*, when rubbed or bruised. It attains a height of 60—100 feet, but is good neither in fruit or as a neighbour. No tree will grow beneath its shade, and even grass is injuriously affected by it. *Ju'glans cine'rea*, or the grey-branched walnut, has 15—17 leaflets to every leaf. The nuts (never produced in England, though often brought in as a curiosity) are oblong-ovoid, very rough with prominent and irregular longitudinal ridges, and acutely pointed at the upper extremity.

To this family belong also the celebrated Hickory-trees of North America, constituting the genus *Carya*, and the produce of different kinds of which appears in the shops under the names of butter-nuts and pecuana-nuts. As seen in English shrubberies and arboretums, the hickories closely resemble walnut-trees. When in flower, however, they are easily distinguished—the hickories always producing their flowers, both male and female, upon shoots developed in the same year as themselves, the males at the lower part, and the females, a few together, at the top of the shoot. Besides this, the catkins containing the male flowers grow three together upon the peduncles, instead of singly, as in walnuts; the stamens do not exceed 3—6; and the leaves do not come out till a fortnight later. The common shell-bark hickory, or *Carya al'ba*, has 5—7 leaflets to every leaf, and a white and globular fruit, with a sharp point, and four longitudinal angles; the pecuana-nut, or *Carya olivæfor'mis* has 13—15 leaflets, remarkable for the semi-circular upper margin, and a fruit not unlike a large acorn. Neither of these ever ripen their produce in Britain, and the trees themselves are by no means common. *Ptero-carya Cauca'sica*, sometimes called *Ju'glans fraxinifo'lia*, is still rarer. The leaflets of this last are oblique at the base, and the flowers, of both sexes, are produced in spikes.

CXLVII. THE PLANE-TREE FAMILY.—*Platana'ceæ.*

The single genus *Plat'anus*, containing perhaps half-a-dozen species, is the whole that this family is at present known to consist of. All are noble timber-trees, natives of the western parts of Asia, Barbary, and North America, and several are extensively cultivated, in climates that suit them, for the sake of their grand appearance, and their ample and generous shade. For towns and cities they are especially valuable. They seem to be fond, rather than otherwise, of smoke and drought, and will thrive in situations where nearly every other kind of tree and shrub is apt to perish. Hence in London the Plane is a universal and special favourite, and gives as much delight perhaps as anciently in the classic groves of Academus. Though it may be small in dimensions, the plane is always majestic and graceful; even while quite young, the foliage is remarkable in forming peculiar horizontal and imbricated masses which allow the passage of air, but keep out the sun and rain; in habit also it is quite as varied as any other tree, some forms being erect, while others are spreading or fastigiate. The fastigiate varieties are particularly valuable, not taking up much room, yet presenting a fine outline and body of foliage.

The leaves in this genus are in general figure and dimensions like those of the sycamore, with which last the plane is sometimes confounded. But no two kinds of tree are more promptly distinguishable, the leaves of the plane being *alternate*, whereas those of the sycamore are *opposite*. The leaves of the plane are also of much firmer texture, hard, thick, and almost leathery, and the foliage is of a yellowish hue, whereas that of the sycamore is generally dark-green. The flowers grow in globular and pendulous catkins, not unlike the heads of the water-burr or *Sparga'nium*. Hanging together on the long peduncles in twos and threes, and even in fours and fives, one globe below another, like large green beads suspended at intervals upon a knotted string, they form an excellent and ready distinctive character; and in winter, when converted into heads of fruit, and the leaves are gone, present a striking and very singular appearance. The bark of the trunk is prone to peel off in shreds. The leaf-buds lie within the base of the petioles.

Two kinds of plane are commonly grown—the maple-leaved or *Plat'anus acerifo'lia;* and the American or *Plat'anus occidenta'lis.* The former appears to be a variety of the *Plat'anus orienta'lis*, and is the kind so largely planted in the metropolis; the petioles of this are green, and the lobes of the leaves are long, very narrow, and acute. In the *occidenta'lis*, on the other hand, the petioles are red, the leaves much larger, not much divided, and the lobes broader, and though pointed, not so acute. The fruit also is larger, and rather smoother, and the tree grows more rapidly.

CXLVIII. THE LIQUIDAMBAR FAMILY.—*Altingia'ceæ.*

Tall trees, natives of India, the Levant, and the warmer parts of North America, not unlike planes in general aspect, but related more directly to the willows. They are remarkable for the abundance of their fragrant and aromatic resin, which oozes, as in the *Sa'lix pentan'dra*, from the serratures of the leaves. The flowers are unisexual, inconspicuous, and mostly borne in clusters; the capsules are 2-celled and many-seeded. One species only is commonly met with—the American Liquidambar or *L. styraciflu'a.* This is a handsome deciduous tree, rising 20—30—50 feet in height, and bearing a good deal of resemblance to a sugar-maple. The leaves are alternate, 3—6 inches in diameter, dark-green and glossy, on rather long petioles, with five deep and pointed lobes, and the margins finely toothed. When they first expand, a small tuft of reddish down is perceptible at the back of the midrib; in autumn they change to an intense purplish-red, more or less mixed with orange, which latter colour is the only one in some of the leaves, continuing however only till the first frost, when they drop almost simultaneously. The flowers come out in spring, the males in little oval and upright racemes; the females, on different branches, in small globular clusters. The Liquidambar unites and harmonises with almost all other trees, and placed upon a lawn, is peculiarly pleasing from its preserving its fine dark glossy freshness throughout the summer. It is one of the trees which show so brilliantly in the coloured autumnal landscapes of North America.

CXLIX. THE SWEET-GALE FAMILY.—*Myrica'ceæ.*

Leafy shrubs and small trees, the foliage covered with resinous glands, and exhaling an aromatic and pleasant odour. About 20 species are known, all extra-European except the common sweet-gale, which is British, and esteemed the most spicy of our native plants. The stems are branched, 2—3 feet high, and in summer well covered with leaves 1—2 inches in length, in shape oblong or lanceolate, broader upwards, slighter toothed towards the extremity, often rather downy upon the under surface, and alternate. The flowers are collected into egg-shaped and sessile catkins, about half an inch in length, and dispersed along the ends of the branches, the males and females upon different individuals, and both sexes appearing before the leaves come out. They are formed during the previous summer, in the axils of the leaves of the current season; by the following March they are full-grown, and in April and May they open their scales. In the male catkins the scales are of a delicate and shining light-brown, edged with white, and have 4 or 8 nearly sessile anthers beneath them; in the females they are inconspicuous, and beneath every scale are a couple of ovaries. When the seeds are ripe, they are somewhat lengthened. Occasionally a plant is monœcious.

HABITATS AND DISTRIBUTION.

SWEET GALE—*Myri'ca Ga'lë.*

Peat bogs and wet moors Abundant in all the northern parts of England, in Scotland, and in Ireland; less so in the south and east. Everywhere upon the moors in the New Forest; and so plentiful in some parts near Manchester that places are named after it, as Gale-house, Gale-moor. Fl. April, May.

E. B. viii. 562; Baxter, vi. 489.

Often grown in gardens, or at least in the districts where it occurs wild. In Wales, the cottagers lay the branches where they will be obnoxious to fleas, the odour being so hateful to these insects that a witty tourist declares the Myrica to be the genuine "Travellers'-joy"! *Myri'ca cerif'era*, or the "Candle-berry myrtle," a native of New Brunswick, grows 6—8 feet high. The leaves are larger and more serrated than those of the *Galë*, and evergreen, and the male catkins are destitute of the shining scales so remarkable in those of our native species. In their own country the little fruits exude abundance of greenish wax, which is manufactured into candles that retain the peculiar colour. Specimens of these candles have been shown at the GREAT EXHIBITIONS. Only one other species is cultivated, a low, bushy, evergreen shrub from North America, called *Compto'nia aspleniifo'lia*, the leaves shaped like those of the *Grammi'tis Cet'erach*, downy, and sprinkled like those of the Myricas, with semi-pellucid and golden-yellow bags of resinous matter. The unisexual flowers are produced in little catkins.

CL. THE OLEASTER FAMILY.—*Elæagna'ceæ.*

Shrubs and small trees, remarkable for having their leaves covered with a silvery-white and leprous scurf, as closely as fishes are covered with scales. Sometimes only the upper surface of the leaf is silvery; frequently, on the other hand, the twigs partake of this singular vesture. There are not many species; the family is spread, nevertheless, over the whole of the northern hemisphere, and is in almost every instance pleasing either in the foliage or in the fruit, which latter is succulent and coloured. Technically there is little difference between the Oleasters and the *Thymela'ceæ*, but the flowers being unisexual, or mostly so, the family is better put next the *Myrica'ceæ*, with which it also has close affinities. Another reason for placing it here is that the ovules are not pendulous, as in the *Thymela'ceæ*, but erect.

One species British.

A tree, attaining in the wild state, the height of 8 or 9 feet. Branches numerous, irregular, hard, stiff, and dark-brown, the extremities, as well as those of the principal twigs, ending in thorns. Leaves very abundant, narrow, 1—2 inches long, scattered, silvery on the under-surface, glabrous upon the upper one, and deciduous. Flowers small, unisexual and diœcious, those of the male trees growing in little spicate clusters, the perianth arched as if it were formed of two leaves united at the tips, and with four stamens, which are not protruded; those of the female trees solitary in the axils of the leaves, yet crowded, and appearing rather before the foliage, or while it is still young, the perianth 2-lobed. Fruit consisting of the enlarged perianth, which becomes distended with juice, orange-coloured, and contains a solitary and polished achenium. SEA-BUCKTHORN.

HABITATS AND DISTRIBUTION.

SEA-BUCKTHORN—*Hippophäe rhamnoi'des.*

Eastern coasts of England, extending from Kent to Yorkshire. Plentiful on the flat sands between Cromer and Yarmouth. Folkstone, by the side of the railway. At Upgang, near Whitby, the small thicket spoken of by Ray still exists. Fl. May. Fruit ripe in September.

E. B. vi. 425; Baxter, vi. 426.

Planted, not uncommonly, in shrubberies and upon lawns, when it often grows to the height of 20—30 feet. If a pair of trees of the different sexes be near together, the female becomes very ornamental, the orange-coloured fruit being produced abundantly, and enduring as long as the leaves, and frequently till the spring. The berries, though not fine-flavoured, are good to eat. At the seaside no plant is more valuable for hedges and fences, since along with the rush-like grasses of the coast, it serves to bind the sand together, and stands the roughest breezes. The scales of the leaves, when removed with a penknife, and examined with a microscope, present the appearance of transparent stars.

The typical genus *Elæag'nus* is represented in the Oleaster or *Elæag'nus horten'sis*, a native of the south of Europe and south-western Asia. As seen in

England, it forms an elegant little tree, 15—20 feet in height, with spinous branches, and lanceolate leaves, the latter 2—3 inches long, and silvery underneath. The flowers are small, but very fragrant, axillary, and in form like those of the mezereon; they grow 2—3 together, and are partly male only and partly bisexual. The bisexual ones are 4-cleft and internally sulphur-colour; the males are 5—8-cleft, and in the inside golden-yellow, the stamens corresponding in number with the lobes, and in both kinds the perianth is covered with glittering stars like those on the leaves. The fruit, which is of the same origin as that of the sea-buckthorn, is reddish-brown, and not unlike a small date. If there be an eminence in the flower-garden or pleasure-ground, with some distant object on the hills beyond, to which it is desirable to attract the eye unconsciously, by planting an oleaster nearly in the line of view, the silvery lustre at once becomes a lure, and the spire, obelisk, or whatever it may be, is noticed at once, and without thought of the means adopted. Where the oleaster is not cultivated, we may often find the *Shepher'dia argen'tea*, a very beautiful spinescent shrub from the banks of the Missouri, the ovate-lanceolate and pointed leaves shining on both surfaces with silvery scurf that makes it seem as if they had been washed over with some metallic solution. When well grown, it will reach the stature of 12—18 feet, but generally occurs only as a bush. The diœcious and 4-cleft flowers appear in early summer, the males in catkin-like clusters, and with eight stamens; the females in small racemes at the ends of the branches, and succeeded by scarlet and translucent berries. A few other species of the family are in cultivation, but seldom seen.

CLI. THE GARRYA FAMILY.—*Garrya'ceæ.*

The sole representative of this family in English gardens, is the *Gar'rya ellip'tica*, a beautiful and very interesting evergreen shrub introduced a few years back, from California. The height attained in this country is 3—4 feet, or when against a wall, 2—3 yards; the leaves are opposite, ovate, exstipulate, leathery, dark-green and shining upon the upper surface, hoary upon the under one; the flowers, produced in early spring, and even before Christmas, are diœcious, those of the male plant (which is alone possessed at present) in abundant and very elegant pendulous gray-green catkins, 6—12 inches long, and clustered several together. The bracts of the catkins are large, concave, and *connate*, rendering the catkins perfectly cylindrical and even-surfaced, a condition not found in any other species of amentiferous plant. Underneath every bract is a 4-leaved calyx with four stamens. For a lawn it would be difficult to select a shrub more striking in general aspect, especially as it is in perfection at a season when so few plants are attractive. The catkins also come in very serviceably to give a rich and attractive variety to bouquets of flowers, especially large ones placed in vases and epergnes. The wood of the Garrya is remarkable for being destitute both of concentric zones and spiral vessels.

CLII. THE NETTLE FAMILY.—*Urtica'ceæ.*

The plants which compose the Nettle-family are very fairly represented in the unsightly and ill-natured weed from which it is named. With the exception of a few tropical species, which attain the stature and bulk, though not the solidity, of trees, they are low-growing and obscure, seldom above 2—3 feet high, usually covered either with stinging hairs or with asperities, and bear minute and unattractive green blossoms. The leaves are simple, very seldom divided, serrate or entire, opposite or alternate, usually petiolate, and with more or less conspicuous stipules. The flowers, which consist of calyx only, are minute, regular, 2 or 4-lobed, and generally unisexual and monœcious, the males with four stamens, opposite the sepals, and the females a solitary and superior ovary, containing a solitary and erect ovule. The stigma is fringed, and usually sessile; the fruit a flattened achenium, covered by the permanent calyx; the embryo straight, and enclosed in fleshy albumen. It is this last character that essentially distinguishes the Urticaceæ from the Goose-foot family, to which in many points they bear a close resemblance, the embryo in the Chenopodiaceæ being *curved.* While the flower is unopened, and for a little while afterwards, the stamens are curved inwards; the filaments, however, are composed of elastic tissue, which, by gradually becoming dry, causes them, at the proper time, to spring outwards. By this movement they become straight and even recurved, and spirt out the pollen. There is a remarkable resemblance between these little springs and those which encircle the thecæ of most of the ferns.

The chief characteristic of the Urticaceæ is the causticity of the limpid juice of many species, well known in the painful stings of the common nettle. In certain Indian kinds the poison is so strong as to affect the whole arm, and extend even to the body. Some, however, are destitute of stings, and then they are merely insignificant. These, it is well to note, are not to be confounded with "dead-nettles," which belong to the genus *La'mium,* in the Sage-family (p. 389.) The stems of the true nettles often contain abundance of strong fibre resembling hemp, and the boiled herbage, while young, is in some cases good to eat. No plants are more widely dispersed, the family being found everywhere, from the poles to the equator, and in all varieties of habitat. Many species follow the footsteps of man, flourishing by the waysides and on the heaps of rubbish near his dwellings, having a fondness, it would seem, for nitrate of lime.

Four grow wild in Britain.

A.

Plant destitute of stings. Stems numerous, diffuse, 6—12 inches long, more or less downy and reddish, and usually forming a dense tuft. Leaves alternate, ovate or oblong, stalked, dark-green, and entire. Flowers in sessile clusters, reddish and minute, and surrounded by a little involucre; the stamens elastic. 4. PELLITORY.

B.

Plant covered with virulent stings. Leaves opposite. Flowers in axillary clusters or spikes. Male flowers 4-parted; females 2-parted. Stamens elastic.

* Perennial. Stems 2—3—6 feet high, more or less downy. Principal leaves opposite, stalked, heart-shaped, somewhat ovate, coarsely-serrated, pointed, and rough. Flowers in axillary, much-branched, and spreading racemes, whitish-green, and very numerous, the males not in the same cluster with the females, and usually upon separate plants. Racemes longer than the petioles. 1. COMMON NETTLE.

** Annual. Flowers usually monœcious.

Flowers in small, loose, axillary, almost sessile clusters, that are usually two together, and shorter than the petioles; the males mostly at the apex, and the females at the base. Stems seldom more than 12 inches high, branched, and glabrous, with the exception of the stinging hairs. Leaves elliptical, stalked, deeply and regularly serrated, and with about five longitudinal ribs. 2. DWARF NETTLE.

Male flowers in little clusters along peduncles that are often as long as the leaves. Female flowers in globular heads, on the summit of peduncles nearly an inch long, the heads covered with stings. Stems 1—2 feet high. Leaves ovate, with transverse ribs. Plant very full of stings. 3. PILL NETTLE.

HABITATS AND DISTRIBUTION.

1. COMMON NETTLE—*Urti'ca dioi'ca.*

Everywhere by waysides, upon rubbish, and in waste places; often also in woods, and as difficult to expel as it is unpleasant to lay hands upon. Fl. summer.

Curtis, ii. 433; E. B. xxv. 1750; Baxter, iv. 298.

2. DWARF NETTLE—*Urti'ca u'rens.*

Waysides, rubbish-heaps, and especially under walls; common everywhere. Fl. summer. Annual.

Curtis, ii. 434; E. B. xviii. 1236.

3. PILL NETTLE—*Urti'ca pilulif'era.*

As a weed in waste places in many parts of England and Ireland, especially near the sea, and probably also in Scotland. Fl. summer and autumn. Annual.

E. B. iii. 148.

In the ordinary state of the plant, the leaves are deeply and regularly serrate. A variety with the leaves more truly ovate, and nearly entire, is called *Urti'ca Dodar'tii* or the "Roman Nettle." In gardens as a curiosity, and occasionally found half-naturalised in Essex, Norfolk, Cambridgeshire, &c.

4. PELLITORY—*Parieta'ria officina'lis.*

Old walls and rocks, among *débris* of fallen cliffs, &c.; sometimes on dry hedgebanks. Common, except in the northern parts of Scotland. Ruins of Beaumaris Castle, in the greatest profusion. Among cliffs in the Isle of Wight, upon marly soil, remote from dwellings, and ruins. Fl. summer.

Curtis, ii. 283; E. B. xiii. 879; Baxter, iii. 224.

Being plants usually of no beauty, nettles and their kindred are little cared for by the gardener, even when destitute of the accustomed stings. Some, however, are interesting in their foliage, as the stingless *Urti'ca bilo'ba*, the leaves of which are cleft nearly in two, and beautifully reticulated. The spikes of male flowers are 7—8 inches long, vertical, and with a resemblance to those of the Spanish chesnut; the female spikes are smaller, and *above* them. The "Artillery-plant," a little stingless species, with innumerable leaves resembling those of wild-thyme, and minute diœcious flowers, very common in indoor ferneries, is *Pilæ'a musco'sa.* The English name refers to the copious discharge of pollen from the stamens, when the little pink filaments straighten themselves as above described,—a phenomenon which may be quickened by slightly sprinkling the plant with water. The anthers empty themselves instantaneously, the contents flying out like the puff of smoke from a distant gun.

CLIII. THE HEMP FAMILY.—*Cannabina'ceæ.*

One of the smallest families in nature, the only species, so far as discovered, being the common hop and the common hemp. The narcotic properties of the former, and the invaluable fibre yielded by the stems of the latter, along with the great beauty of the two plants, give it an importance, however, unlikely ever to be gained by many others which in complexity and compass exceed it twenty-fold. Authors in general combine this family with the Urticaceæ: but in that the ovule is erect, and the embryo albuminous and straight; whereas in the present one the ovule is pendulous, and the embryo hooked or spirally coiled, and without albumen.

Hemp, botanically *Can'nabis sati'va*, is an elegant annual, indigenous to the cooler parts of India. The stem, which is nearly simple till near the top, rises 3—6—12 feet high; the leaves form a conspicuous tuft at the upper part, and are quinate or septate, with lanceolate, serrate, and acuminate lobes 3—4 inches in length; the green flowers are unisexual and diœcious, those of the male plant growing in long upright racemes, with conspicuous anthers, while those of the female are axillary and sessile, and very abundant. The seeds are small and gray. In colour the whole plant is of a remarkably dark-green, and in peculiarity and strength of odour (perceptible even without bruising it), so striking as never to be forgotten when once known. The female plant is much more robust than the male, but not so tall, and slower of growth. Hemp is cultivated, for the sake of the fibre, in Suffolk, Yorkshire, and Lincolnshire, and as a curiosity, not infrequently, in gardens.

The Hop is a native of all the northern parts of Europe and Asia, and grows wild in our own country. The stems are slender and twining, often reaching to a distance of many yards in friendly hedges, and have their surface rough with minute prickles. The leaves are opposite, some of them heart-shaped and undivided, the remainder 3 or 5-lobed, and as many inches across, very rough, puckered, and supported on petioles. The male flowers, like those of the hemp, are pentamerous, 5-stamened, green, and borne in large, light, branching panicles; the females are clustered into little ovoid catkins about an inch in length, in form resembling fir-cones, and composed of numerous broad, concave, and closely-packed scales, with two minute and sessile blossoms in every axil. The scales composing these coniform catkins are sprinkled over their inner surface, near the base, with resinous glands of a bright yellow tint. When overblown, the glands become loose and roll away. The microscope shows similar glands upon the under side of the leaves; quick eyes may even discern them without its aid.

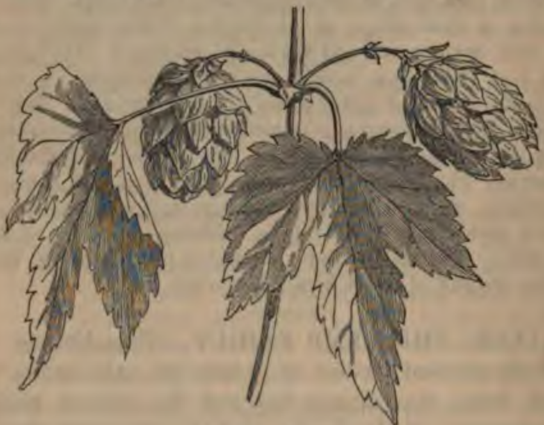

Fig. 185.
Common Hop *(Hu'mulus Lu'pulus).*

HABITATS AND DISTRIBUTION.

Common Hop—*Hu'mulus Lu'pulus.*

Hedges and thickets, damp and bushy places, and on the banks of streams; forming a dense and vine-like mantle, or trailing elegantly, or ascending young trees, according as opportunity permits. Common, except in Scotland. Fl. towards end of summer. Root perennial; stems annual.

E. B. vi. 427; Baxter, v. 342.

Some believe the hop to be an introduced plant, but there can be little doubt of its being a veritable ancient Briton, rendered more general by cultivation. The counties in which it is grown, Kent and Worcestershire, give us, at the ripest season of the year, one of the most charming spectacles our island affords, and which represents, in a measure, the vintage of France and Spain. As in the hay-field, young and old work side by side, the little child helping the patriarch; and not infrequently the fragrant harvest is gathered in part by hands that never knew any heavier toil. In its wild state the hop is without a rival, or at least as we see it in September, when the vine-like wreaths festoon the tall and untrimmed hedges of the country, hung either with the pale green tassels of the female flowers, or with the light and feathery panicles of the males, that shed clouds of yellow pollen with the lightest touch. For a garden pyramid or trellis, where its branches can float idly in the air, it is unequalled; balcony-windows, which it is intended to veil with convolvulus, should always have a hop led round them first.

CLIV. THE FIG-TREE FAMILY.—*Mora'ceæ.*

None of this family are European by birthright, and few are seen in Britain except the common fig, the purple mulberry, and a few green-house forms valued chiefly for their foliage. In the tropics the species are numerous and often remarkable. India and the countries around the Indian Ocean have a peculiar botanical character given them by the famous Banyan-tree, and various kinds of colossal and semi-parasitic *Ficus;* other species are of immense value as supplying india-rubber by incision of their trunks. In affinities, the Moraceæ are so near the nettle and its allies, that many botanists do not keep them apart, combining the fruit-trees with the virulent weeds, the Indian epiphytes with the northern herbs, and making of them one great, though in appearance heterogeneous, family. When it is remembered that some of the tropical nettles are arborescent, the association does not seem so unnatural.

The Fig-tree *(Fi'cus Cari'ca)* is a native chiefly of the coasts and islands of the Hellenic archipelago. Hence its greater freedom of growth, better endurance of the winter, and more abounding fruitfulness, when cultivated in places near the sea than when inland. In the Isle of Wight, and along the opposite coast of Hants, it is common as a standard, attaining considerable stature and girth, and producing, every season, plentiful crops. At Beaumaris also, and in many other places, it grows luxuriantly, and ripens excellent fruit, but ordinarily, at least in the north, to be sure of success, it must be dealt with like the vine, and protected under glass. Not until the lower extremity is of the same colour as the upper, is the fig perfectly ripe.

To mistake this famous tree is impossible. The bark is smooth and gray; the stem, on being wounded, pours out a milky juice of peculiar odour; the leaves are the size of a man's hand, dark-green, rough, and upon long petioles, with about five great finger-like and rounded lobes, though sometimes almost cordate. The flowers lie where they would scarcely ever be sought, namely, in the interior of the young figs. Resembling small green pears, these are in reality concave and fleshy receptacles, nearly closed at the top, and bearing on their inner surface a vast number of minute, incomplete, and unisexual blossoms, which of course are only seen by cutting the fig in half. It is then found to have a cavity in the centre, projecting into which are innumerable bracts. Near the orifice at the summit there are a few male flowers; the remainder of the space is thickly occupied by females, every one of which is capable of producing a perfect seed, though many are constantly abortive. Every one of the minute yellow grains contained in the substance of a dried fig from Turkey, is the produce of a separate blossom, just as the black seeds disposed upon the head of a sunflower, come of an equal number of independent florets. There is a closer analogy between these two things than at the first view we might expect, and each makes the other more intelligible. The fig is like the receptacle of a Compound flower, only concave instead of convex; the receptacle of a Composite is a fig as it were laid open and dilated. The true idea of the structure is exhibited by the *Dorsté'nias*—curious greenhouse herbaceous plants of the same family, with large, broad, undivided leaves, and flowers that exactly resemble figs turned inside out. The receptacle in this genus is elevated upon a peduncle a few inches in length, and resembles a stipitate Peziza with raised and crenelled edges. The surface, which is 1—2 inches across, and nearly square, is covered with small papillæ, some of them containing male flowers, with solitary stamens, while others, perforated at the summit, contain the ovaries. The heads are greenish or purplish, and though very slightly ornamental, highly instructive to the student of minute structure. (See Bot. Mag. liv. 2760; lv. 2804, &c.) The fig, it may be added, was first brought to England in the reign of *Henry* VIII.

Of the mulberry, there are two distinct species—one famous for its fruit; the other in connection with those

> ——————— Millions of spinning worms,
> That in their green shops weave the smooth-haired silk.

The first, *Mo'rus ni'gra*, or the purple mulberry, is a native of Persia, though naturalised for ages upon the coasts of Italy. It is a good-sized but rather scrubby tree, slow in growth, and in England attains the height of 20—30 feet, and endures for several centuries. It is one of the last trees to acquire its foliage, seldom being green over till the middle of June. The leaves are alternate, cordate, or slightly 3—5-lobed, 2—3 inches across, serrate, and rough; the flowers are green, inconspicuous, unisexual, and monœcious. Both sexes are tetramerous, the males with four stamens, and growing in axillary and pendulous clusters; the females with two stigmas, and produced in erect and ovoid spikes. After blooming, the two outer and larger sepals of the female flower combine with the ovary; all these parts at the same time become distended with purple juice; they coalesce, after the manner of the ovaries of the pine-apple, and the result is an oblong mass of *quasi*-berries, constituting the fruit. Individual trees are sometimes almost perfectly diœcious.

The silkworm mulberry is *Mo'rus al'ba*, a native, as would be anticipated, of China. It is readily distinguished, even in winter, by its shoots, which are more numerous than in the *ni'gra*, upright, and with whiter bark. The leaves are less rough, and more succulent, and the whole tree is of more pleasing appearance. In Britain it is rare, and does not produce fruit. Failing it, those who rear silkworms find the leaves of the *ni'gra* serve their purpose.

Of the other members of this family occurring in British gardens and greenhouses, by far the most interesting is the India-rubber-tree or *Fi'cus elas'tica*, a plant easily cultivated and very common. It is usually seen with a slender stem 2—3—4 yards high, and bearing towards the upper part abundance of handsome oval leaves a foot in length, rich deep green on the upper surface, perfectly entire, and in texture leathery. The little *Fi'cus re'pens* is esteemed as a self-adhesive tapestry for greenhouse walls, upon which it represents the ivy of the open air. Other little figs are sometimes seen with their miniature fruit upon them. The Chinese paper-mulberry, *Broussone'tia papyrif'era*, (Bot. Mag. xxx. 2358.) and the Osage-orange, *Maclu'ra auranti'aca*, are occasional inhabitants of arboretums.

CLV. THE SPURGE FAMILY.—*Euphorbia'ceæ.*

The Euphorbiaceæ rank with the largest and most important families of which botanists have knowledge, the number of species probably amounting to not less than 2,500, and a very considerable portion being possessed of intensely active properties, that have given them celebrity, both in medicine and as poisons. Few, however, come before the English student, the mass of the family being tropical, and only a species here and there sufficiently beautiful to excite the interest or even the notice of the gardener. About three-eighths of those hitherto discovered have been found in equinoctial America; the warmer parts of Africa contain the next largest proportion; in Europe there are scarcely more than 120, and in temperate North America not half so many. No family is more diversified in aspect. Tall trees, shrubs, stout and milky herbs, diminutive green weeds, and deformed and leafless plants resembling cactuses, represent it in different countries and different latitudes, rendering a just idea of the family quite impossible, so long as attention is confined to the few stragglers in our own island. The genera of these latter differ, moreover, so much among themselves, that save for the links supplied by foreign ones, even their own connection might be doubted. Notwithstanding these diversities, no family, taken as a whole, admits of being characterised in fewer words:—the flowers are unisexual, and the fruit is in almost all cases a 3-celled capsule, the cells containing each a solitary seed, and when ripe, opening vertically on the inner side, and letting it fall. Nowhere else are the peculiarities in question found together, so that despite the endless variety of general figure, a Euphorbiaceous plant, if we can but secure an ovary, is generally determinable with facility. It is somewhat odd that the few exceptions which do occur, should await us among the very first species usually encountered, viz., in the mercury, the fruit of which is only 2-celled, and in the box-tree, the cells of which are 2-seeded. Another very curious exception, as regards the fruit, is seen in the handsome capsule so common in parlour-museums under the name of the "Indian sand-box," the cells of which are usually ten or twelve. The capsule in question is the produce of a noble tree of tropical America, botanically *Hu'ra crep'itans*, and might be taken for a carving in wood, only that the large flat seeds rattle in the interior. It is a further source of perplexity that in the ordinary genera of this family, the flowers are singularly incomplete, and that in the typical genus—the commonest of all, and the most numerously represented—

they are reduced to the lowest possible state of development, and would never be supposed to be unisexual without the most careful examination with the microscope, though fortunately, the great family character derived from the triple fruit remains conspicuous. Throughout the family, the flowers, whether incomplete or fully developed, are insignificant, but nowhere are they so much depauperated as in the true Euphorbias. The males are diminished to a single stamen, articulated to a microscopic peduncle, which proves their nature; the females consist of no more than a pistil; neither sex possessing any perianth, or at most nothing more than a microscopic scale, and which occurs only at the base of the male flowers. These little pedunculated stamens are associated in companies of about a dozen, with a female flower in the centre, and an involucre of 2—6 bracts round about them. We seem, accordingly, at the first glance, to have a single and polyandrous flower of ordinary structure; and the impression is strengthened by these bracts (at all events in the tropical species) being often brilliantly coloured, and disposed with so much symmetry, as to exactly resemble a pentamerous or dimerous corolla, or at least a regular and petaloid perianth. The stamens do not attain maturity all at once, but in succession; and the ovary is usually supported upon a

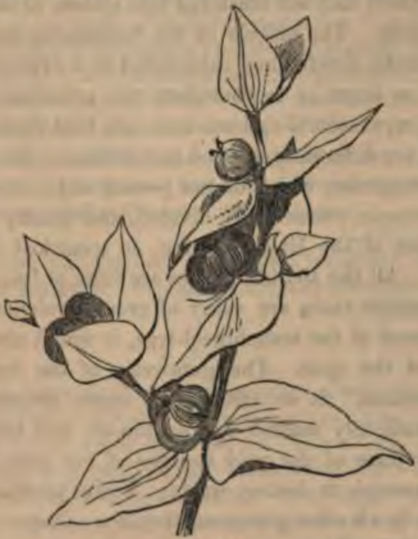

Fig. 186.
Caper Spurge (in fruit.)

stalk which carries it beyond the margin of the involucrum, over which it hangs down conspicuously—an elegant little triple bead, surmounted by a 3-cleft style. There are species, however, in which the ovary is permanently erect; there are others in which a portion of the involucres contain only male flowers; and these last organs, although usually twelve in number, are occasionally as few as two, or as many as twenty. Linnæus, supposing the Euphorbias to be really what they appear, placed the genus in his "Dodecandria Trigynia." The inflorescence is various. Some species have the flowers axillary, and sessile, or nearly so; in others they are clustered into spikes, or borne in terminal racemes or umbels. The umbels of the herbaceous and weedy kinds are often repeatedly divided and subdivided in a cymose manner; and are frequently so large as to constitute the principal portion of the plant, the long rays resembling branches, only that they all spring from one point, and are differently dressed as to foliage. The leaves (except in the cactiform species, which do not possess any) are either opposite or alternate; simple, occasionally divided, and usually glabrous.

The properties of the Euphorbiaceæ, as remarked before, are extremely active. All the British species are more or less poisonous, and in foreign countries there are many of great virulence. If all were true that is related of the manchineel-tree, it would almost realise the famous fable of the upas. The gum-resin of the druggists' shops, called "euphorbium," is so acrid as to cause inflammation of the nostrils, if incautiously snuffed up; croton-oil will blister the skin; even the milky juice of the wild spurges of our own country is reported caustic enough to destroy warts. Useful products are afforded nevertheless, as by all other poisonous families. Castor-oil is expressed from the seeds of the *Rici'nus commu'nis*, a tree abundant in the hotter parts of the eastern hemisphere. Tapioca is prepared from the roots of a Brazilian plant called *Jani'pha*, poisonous before the meal is exposed to the action of heat; india-rubber (a product of many plants) flows from the stems of the *Sipho'nia elas'tica*.

Of species indigenous to our own country the number is considered to be 17. Two formerly accounted native are now omitted from the lists, namely, *Euphor'bia Chara'cias* (E. B. vii. 442.) and *Euphor'bia Cyparis'sias* (xii. 840.) In their place, one or two others are becoming naturalised, as *Euphor'bia salicifo'lia*, a Hungarian species with lanceolate and villous leaves, known in our gardens since 1804, and now established in Main's Flowery Den, two miles north of Dundee, on the north bank of the river, nearly opposite the castle.

A.

An evergreen and much-branched shrub or small tree 6—12 feet high. Leaves opposite, ovate-oblong, about an inch in length, leathery, and shining.—Flowers small, greenish, sessile, clustered in the axils of the leaves, and consisting only of bracts; the clusters usually consisting of 3—5 male flowers, and 1—2 females. Stamens four. Styles three. Ovary becoming a 3-horned capsule, which separates into three pieces, each containing two large black and brilliantly-shining seeds. 1. COMMON BOX-TREE.

B.

Herbaceous plants of upright growth, the stems 6—18 inches high. Leaves opposite, ovate and serrated. Male flowers scattered at intervals along delicate and erect peduncles, and consisting of a green 3-cleft perianth and nine stamens, or sometimes more. Female flowers usually on separate plants, 1—3 together, and nearly sessile in the axils of the leaves. Ovary 2-celled, with two large recurved stigmas. Seeds ovoid.

Root perennial. Flowering-stems annual, simple, generally many together. Leaves 2—3 inches long, very dark green, rough, and rather crowded at the upper part of the stem. 2. COMMON MERCURY.

Plant annual and glabrous. Stem much branched. Leaves thin and semi-translucent. Seed-leaves elegantly reticulated. 3. ANNUAL MERCURY.

C.

Herbaceous or under-shrubby plants, with greenish or yellowish flowers of the structure described on p. 609; the cup-shaped involucres usually borne in terminal umbels, the rays of which are more or less forked and subdivided, and have numerous pairs of leaf-like bracts about them, especially at the points where the branches and rays divide. (These bracts it is convenient to designate, in the present genus, by the name of "floral-leaves.") Involucres with 4 or 5 small teeth that alternate with an equal number of yellowish glands. Ovary upon a very long peduncle, and hanging out. Fruit of three carpels, each containing a solitary ovoid seed. Leaves undivided, usually narrow. Plant usually abounding in milky sap.

A. *Leaves with minute stipules.* Stems flat upon the ground, repeatedly forked, the branches 6—12 inches long. Leaves broadly-oblong, very obtuse, numerous, and all opposite. Involucres axillary. Plant annual, glabrous, glaucous, and purplish. 4. PURPLE SEA SPURGE.

B. *Leaves destitute of stipules.*

* Leaves all opposite, numerous, in four vertical rows, narrow-oblong, 3—4 inches in length, the upper ones broader, cordate at the base, and all sessile, entire, and of a beautiful glaucous hue. Stem of the same colour, unbranched, 3—4 feet high. Umbels of 3—4 forked rays, with large floral-leaves at the base of every fork. Capsules large and conspicuous. 17. CAPER SPURGE.

(Herbaceous or under-shrubby. Flowers in involucres. *Leaves destitute of stipules.*)

** Leaves alternate or scattered.

† Glands of the involucrum crescent-shaped, the two horns turned outwards.

a. Floral-leaves *connate.* Stem 2—3 feet high, reddish or purple. Leaves ovate-lanceolate. Rays of the umbel five; not much divided. Foliage becoming stained with purple. 11. GREAT SYLVAN SPURGE.

b. Floral-leaves *free.*

1. Rays of umbel 3, rarely 4—5. Plant annual, permanently green, 3—6—10 inches high. Leaves entire.

Stem-leaves linear; stem branched at the base. 15. DWARF CORNFIELD SPURGE.

Leaves broadly-ovate. Umbel large. Horns of the 4-lobed involucrum very long. 16. HORNED GARDEN SPURGE.

2. Rays 5—6. Sea-shore perennials.

Leaves oblong, thick and leathery, imbricated at the upper part of the plant, and very abundant, especially on the flowerless branches. Umbels compact. Plant 1—2 feet high, glaucous green. Sap clammy. Seeds smooth. 13. GREAT SEA SPURGE.

Leaves thin. Floral-leaves broadly-cordate. Umbel spreading. Plant 3—12 inches high, very branchy. Seeds pitted and netted. Umbels and floral-leaves fine red or orange-coloured in autumn. 14. PORTLAND SPURGE.

3. Rays 8—10. Leaves lanceolate. Stem 12—18 inches high. Perennial woodland plant, increasing much by the root. 12. LEAFY WOOD SPURGE.

†† Glands of the involucrum rounded on the outer edge.

a. Leaves finely serrate. Rays about five, 3-cleft, and then forked.

1. Leaves obovate and very obtuse. Capsules smooth. Plant light yellowish-green, not changing colour in the slightest degree in autumn, and very full of milky sap. Stem erect, 6—18 inches high. Annual. 5. SUN SPURGE.

2. Stem-leaves oblong, usually pointed. Capsules more or less warty.

Stamens rarely more than two in an involucre.—Leaves narrow. Plant often 3—4 feet high, and with numerous branches below the umbel. Seeds, when the testa is removed, almost pyriform. 6. UPRIGHT WOOD SPURGE.

Stamens 7—8 in an involucre. Leaves broad. Seeds, when the testa is removed, almost globular. 7. BROAD-LEAVED SPURGE.

(Herbaceous or under-shrubby. Flowers in involucres. *Leaves destitute of stipules*, alternate or scattered. Glands of the involucrum rounded.)

b. Plant perennial. Leaves usually entire.
  1. Umbel compact. Rays six. Capsule glabrous, but much warted. Leaves an inch broad, and 2—3 inches long. Plant 1—2 feet high, and full of milky sap. 8. Irish Spurge.
  2. Umbel loose. Capsule not warty.
    Floral-leaves elliptical and glabrous. Capsules hairy and minutely tubercled. 9. Hairy Spurge.
    Floral-leaves ovate-oblong and hairy. Capsules woolly. 10. Coral Spurge.

HABITATS AND DISTRIBUTION.

1. Common Box-tree—*Bux'us sempervi'rens.*

Boxhill, near Dorking, Surrey, as a shrub, growing plentifully among junipers, the only uncultivated British locality in which the fruit ripens. Also upon hill-sides at Chiltern, Herts, near Whiteleaf Cross. Fl. March, April.

E. B. xix. 1341; Baxter, ii. 142.

Everywhere in gardens, on the borders of shrubberies, and in plantations. The Box used for the edgings of flower-borders is a dwarf state of the same plant, never seen in blossom. In Turkey and Asia Minor the stature is 25 feet, and the trunk acquires a diameter of 9—12 inches. It is from these countries, Circassia, &c., that the box-wood used in the arts is received. The delicate colour, smoothness, and markings have given it esteem in all ages. "Pyxidia," with the ancients, were little boxes manufactured from it, the beauty of which is acknowledged in the name still used in the Catholic Church for the sacred box containing the Host.

2. Common Mercury—*Mercuria'lis peren'nis.*

Shady hedgebanks, and among trees and bushes; very common everywhere, except in the north of Scotland. Fl. early in the spring, before the leaves are fully expanded, sometimes as early as January.

Curtis, i. 138; E. B. xxvi. 1872; Baxter, ii. 143.

An unpleasantly scented, ill-favoured, and very poisonous plant, yet welcome in its reappearance in the spring, being one of the first that show green sprouts. Sometimes partially evergreen.

3. Annual Mercury—*Mercuria'lis an'nua.*

Waste and cultivated ground; rather uncommon, especially towards the north, and by no means certainly native. Very frequent about Bristol, in kitchen-gardens and upon heaps of garden refuse. Fl. June—September. Annual.

E. B. viii. 559.

The seedlings are remarkable for the net-like markings of the cotyledons. A variety, with the leaves lanceolate, and the male and female flowers intermingled, is figured in E. B. Supp. iii. 2816, as *Mercuria'lis ambig'ua.* Ipswich (about the docks). Isle of Wight. Jersey.

Curtis, i. 36; E. B. xiii. 88

6. UPRIGHT WOOD SPURGE

Woods upon the slopes of the hills o
near Tintern Abbey and the Wind Cli
tiful. Fl. July, August. Annual?

7. BROAD-LEAVED SPURGE—

Cornfields, waysides, fallow ground,
the south. Isle of Wight, common.

E. B. v. 333 (as *Euphor'bia stric'ta*, and

8. IRISH SPURGE—*Eup*

Along the northern border of the E
near Lynmouth, Devonshire; also in
June—July.

E. B. xix. 1

9. HAIRY SPURGE—*E*

"In a lane west of Prior Park, ne
east of the same place." Fl. May—J

E. B. Supp. ii.

10. CORAL SPURGE—*Eu*

Slinfold, Sussex; introduced? Fl.

E. B. Supp. iii

11. GREAT SYLVAN SPURGE—

Woods, groves, and shady hedgeb
England, and particularly so in the sou
of Ireland, but in Scotland not found.
localities and fine seasons very much

13. GREAT SEA SPURGE—*Euphor'bia Para'lias.*

Sandy sea-shores, often half-buried in the drift; abundant in the south-east and south, and extending up the coasts of the Irish Sea almost to Scotland. Similarly diffused along the southern coasts of Ireland. Fl. July—September.

E. B. iii. 195.

14. PORTLAND SPURGE—*Euphor'bia Portland'ica.*

Sandy sea-shores and sandhills on the coast; common, except upon the eastern side of the island and in the north of Scotland. Abundant at Torquay, and on the Lancashire coast, between Liverpool and Southport. Fl. May—September.

E. B. vii. 441.

In autumn, a very pretty and conspicuous object, the floral-leaves and bracts turning crimson and orange-colour, while much of the plant is still green and in full flower. Brought into the parlour, and placed in bright lamp or gas light, the richness of the colours renders this plant a beautiful ornament for the table.

15. DWARF CORNFIELD SPURGE—*Euphor'bia exig'ua.*

Cornfields on a light soil; common, except in the remoter parts of Scotland. Fl. July—September. Annual.

Curtis, ii. 256; E. B. xix. 1336.

16. HORNED GARDEN SPURGE—*Euphor'bia Pep'lus.*

Waste and cultivated ground, especially ill-weeded kitchen-gardens. Common, except in the north of Scotland. Fl. July—Nov. Annual.

Curtis, i. 35; E. B. xiv. 959.

17. CAPER SPURGE—*Euphor'bia Lath'yris.*

Stony and rocky woods and waste places; rare, and perhaps naturalised from castaway garden roots or seeds, being of very old and general cultivation as a garden ornament. Upton, near Reading. Fl. June, July.

E. B. xxxii. 2255.

With the exception of the common Box-tree, euphorbiaceous plants occur in gardens but sparingly, and, after the *Euphor'bia Lath'yris*, above described, the two or three other species formerly considered British, are alone of any frequency. The best of them, *Euphor'bia Chara'cias* (E. B. vii. 442.) is a handsome evergreen, well adapted for rockwork, by its bushy habit of growth, and blueish-green and shining leaves, which are lanceolate, acute, entire, downy, and spread in every direction. The flowers come out in thin panicles, along the upper portions of the shoots, and present a fine dark-purple in all the coloured part of the inflorescence. Unfortunately they have a powerful and disagreeable scent. The capsules are downy. *Euphor'bia Cyparis'sias*, the cypress spurge, (E. B. xii. 840.) is a pleasing little species of extremely frequent occurrence, especially in old-fashioned and cottage-gardens. The stems are numerous, 9—15 inches high,

in England it is only a large herbaceous an
resembling those of the rhubarb, but mor
objects of ornament. When somewhat sha
stateliness of aspect, and delicate tints of
surface being covered with a delicate blueis
must stand in the full sunshine, when the r
spikes, the females (in remarkable and ra
higher up on the peduncle than the mal
prickly; the ripe seeds are in form like
mottled.

The Euphorbiaceæ in our collections th
glass, comprise most of the interesting eco
seen in England, are generally small, and
esteemed for the brilliancy of their infl
Euphor'bia splen'dens, from the Mauritius, i
plant, with stiff thick stems that are cover
thorns nearly an inch long, mingled with
leaves; and bearing, chiefly near the summit
blossoms, formed of two broad vermilion-c
what is really only the involucre, looks lik
part of the main peduncle is sticky; the b
the base, and have a pair of bracts at ever
petaloid glands, about twenty male flowers
a solitary female with three styles and bifid
a number of hairs. In the microscope thes
the pedicels being green, the filaments r
bearing a one-celled anther of a dark-purp
Euphor'bia splen'dens will attain a height
yards. *Euphor'bia ful'gens* or *Jacquiniflo'*

render a spray of this plant one of the most beautiful and striking ornaments for the head that a lady can wear, when desirous of a pleasing effect, especially by artificial light. *Poinset'tia pulcher'rima*, a splendid species from Mexico, (lxiii. 3493.) is inestimable in the gorgeous tuft of great scarlet lanceolate leaves which crowns the stem, and which, like the flowers of the *ful'gens*, appear in winter. Fine examples often measure 12 inches across. Occasionally these floral-leaves are white or cream-coloured; the actual blossoms are insignificant and reddish-orange colour; the ordinary leaves are broad and angular, 3 or 4 inches long, and petiolate. *Cro'tons* have their entire foliage beautifully painted. The leaves are for the most part long and narrow,—so slender in the *Cro'ton angustifo'lium*, that being pendulous, they make the plant seem a fountain of green and gold. The most splendid is the *Cro'ton* or *Codiæ'um pic'tum*, from the Moluccas, a low shrub with the habit of the common spotted-laurel, glabrous in every part, and having the foliage collected chiefly at the ends of the branches. The leaves are 4—6 inches long, laurel-like, leathery, and mottled and variegated with red, crimson, yellow, and green, one colour flashing through the other, and occasionally dividing into distinct patches. The yellow, in plants of the *Cro'ton* kind, generally runs up the leaf by way of midrib. To glance down a line of these lovely shrubs, well mingled in their colours, and alternating with *Dracæ'nas*, *Cala'diums*, Ferns, and similar plants, as placed in large conservatories, is to have a peep into fairy-land.

Of the less conspicuous, but still very interesting plants of this family, the prettiest are the different species of *Xylophyl'la* and *Phyllan'thus*, (xxvi. 1021; xliv. 1862.) the little yellowish blossoms of which come out abundantly along the edges of flattened branches that in the handsomer kinds resemble great pinnate leaves. *Jani'pha Mani'hot*, (lviii. 3071.) the cassava-plant, grows 6—7 feet high, and has leaves divided to the base into five lanceolate segments. *Omalan'thus populifo'lia* (liv. 2780.) in foliage is not unlike the black poplar. *Jatro'phas*, (xvii. 604; xxxvi. 1464.) species of *Aleuri'tes*, *Hippom'ane*, *Ompha'lea*, *Stillin'gia*. *Eu'clea*, *Cœlebogy'ne*, &c., occur now and then in large collections, along with cactiform Euphorbias from Africa. *Euphor'bia Canarien'sis*, to judge from the photograph in C. Piozzi Smyth's "Teneriffe," (p. 404, 1858.) must be one of the most wonderful plants in nature. *Bux'us Balea'rica*, which has leaves three times as large as those of the common box, and grows taller; and *Cluy'tia alaternoi'des*, a half-hardy shrub from the Cape of Good Hope, (xxxii. 1321.) are perhaps rather more frequent, but possess little popular interest.

CLVI. THE CASUARINA FAMILY.—*Casuarina'ceæ.*

Very singular trees and large bushes, indigenous, chiefly, to the temperate portions of the Australian continent. In composition they remind us of certain Equisetums, such as *Telmatei'a* and *sylvat'icum;* being formed of abundance of long, drooping, slender, and leafless branches, which are divided by joints into numerous and striated internodes, and the place of leaves being taken, again as in Equisetums, by little toothed and striated sheaths. The flowers are unisexual, inconspicuous, and very simple in structure, the males growing in spikes, the females in dense lateral heads, which ripen into hard, brown, and woody cones 2—3 inches in length, and covered, after the escape of the seeds, with vertical fissures. These cones, like the odd capsules of many of the Australian Proteaceæ, differ totally from every kind of fruit produced in Europe. The seeds are remarkable for their dense clothing of spiral vessels.

Several species occur in greenhouses, as *Casuari'na equisetifo'lia, stric'ta, torulo'sa,* and *quadrival'vis.*

CLVII. THE CROWBERRY FAMILY.—*Empetra'ceæ.*

Small, dry, heath-like and evergreen shrubs, allied to the Euphorbiaceæ, and differentiated only by some minute peculiarities of the fruit. One species British.

Stems wiry, trailing upon the ground, except, when from their abundance, they prop one another up; then forming thickly-branched and matted tufts, 1—3 feet in diameter. Leaves narrow-linear, an inch long, crowded, and dark-green, with their edges so much rolled back as almost to meet. Flowers minute, unisexual, seated in the axils of the upper leaves, and consisting of six little scales placed in two rows, with six smaller ones external to them. Anthers large and purple, on long filaments that bring them plainly into view. Ovary inferior and solitary, with six or more radiating stigmas. Fruit a globular black berry, the size of a pea, with a crimson dimple on the summit, and containing 6—9 triangular seeds arranged in a circle. CROWBERRY.

HABITATS AND DISTRIBUTION.

CROWBERRY—*Empe'trum ni'grum.*

Dry moors, heaths, and mountain-sides, generally a companion of whortleberries. Common in the north of England, in Scotland, and in Ireland. In the south very unusual. At Saltwick Ness, near Whitby, almost within reach of the tide. Fl. May; berries ripe in August.

E. B. viii. 526; Baxter, vi. 469.

Though not remarkable for beauty, the crowberry is invaluable upon the moors, where the fruit is of great service to grouse and other mountain birds. The flavour is elder-like, mild, but not agreeable. When the plant is in full bloom, if we brush the great bosses with the foot, the pollen flies off like smoke. Before touching it, the innumerable anthers cover the plant as if with beads.

Little available for the garden is supplied by this family. *Ceratio'la ericoi'des* (Bot. Mag. liv. 2758.) is an upright, much-branched, twiggy shrub, rising 2—4—8 feet from the ground. The thickly-packed leaves are linear, and barely an inch in length. The flowers resemble minute catkins, and are produced in the upper axils. Native of Georgia and South Carolina.

CLVIII. THE WATER-STAR FAMILY.—*Callitricha'ceæ.*

Insignificant aquatics, generally submerged, but sometimes forming dense green masses on the surface of mud close to water. Stems long and slender. Leaves small, numerous, oval or linear, and entire, the lower ones opposite, the uppermost growing in compact rosettes about an inch in diameter; the rosettes, from their number, bright and lively green, and pretty starlike figure, presenting a conspicuous object in ditches and ponds, which are the common habitations of these little but abundant plants. When growing in running water, and where entirely submerged, the leaves are very narrow, and sometimes no rosettes are formed. The flowers are exceedingly simple, and as in all the other families of this group, unisexual. The males grow in the axils of the rosetted leaves, and consist only of a stamen, the large yellow anther contrasting strongly with the green of the foliage; the females occupy axils a little below, where the leaves are some distance apart, and consist of a green, 2-lobed, and usually sessile ovary, with two long green styles. Neither male nor female flowers have any perianth, though usually provided with a pair of minute bracts.

Four species have been distinguished as British, but it is difficult to suppose that they are anything more than modifications of a single one. The characters, according to Mr. Babington, are as follow:—

A. Lobes of the fruit parallel in pairs.
 * Lobes bluntly keeled on the back.
  a. Styles erect and deciduous .... *Callit'riche ver'na.*
   Curtis, iii. 54; E. B. xi. 722 (in part); Baxter, v. 392.
  b. Styles divaricate, persistent, and reflexed over the fruit.
   Callit'riche hamula'ta.
   "*Callit'riche peduncula'ta*" (E. B. Supp. i. 2606, as *C. autumna'lis*) is said to be a small variety of this.
 ** Lobes slightly winged on the back. Styles erect in flower; persistent and reflexed closely in fruit.............. *Callit'riche platycar'pa.*
   E. B. Supp. iii. 2864.
B. Lobes spreading in a star, broadly and acutely winged at the back. Leaves all submerged, very obtuse. Fruit four times as large as in *C. ver'na.*
   Callit'riche autumna'lis.
   E. B. Supp. i. 2732.

HABITATS AND DISTRIBUTION.

COMMON WATER-STAR—*Callit'riche aquat'ica.*

Ponds, slow streams, ditches, &c., and often stranded upon the mud that borders them. Common all over Britain, except the form called *autumna'lis*, which is said to be "rare." Fl. spring to autumn, but chiefly in early summer.

CLIX. THE WATER-HORNWORT FAMILY.—*Ceratophylla'ceæ.*

Limited, so far as known, to half-a-dozen insignificant aquatics of the northern hemisphere, the whole plant living submerged.

One species British.

Stems floating, long and slender, branched, and densely clothed with whorls of leaves that are twice or thrice forked, the segments 1—2 inches long, slender, cellular, and rigid. Upper whorls often so densely in contact as to form a dark-green ball. Flowers sessile in the axils of the less crowded leaves, minute and green, unisexual, and composed of only a few bracts. Male blossoms containing 12—20 sessile anthers; females consisting of a small and simple ovary, with a solitary seed.

COMMON WATER-HORNWORT.

HABITATS AND DISTRIBUTION.

COMMON WATER-HORNWORT—*Ceratophyl'lum demer'sum.*

Stagnant waters, ditches, and fish-ponds; common, though probably often overlooked. Fl. summer, but very seldom.

E. B. xiv. 947; Baxter, iv. 260.

A slight variety, called *Ceratophyl'lum submer'sum*, is figured in E. B. x. 679.

CLX. THE PITCHER-PLANT FAMILY.—*Nepentha'ceæ.*

There are a few plants in the world of such extraordinary conformation that they cannot be associated with any others, and stand as little families by themselves. Such is the case with the 10—20 species of *Nepen'thes*, or pitcher-plant, inhabitants of the swamps of China, the East Indies, and the islands of the Indian seas, and commonly represented in our hothouses by the *Nepen'thes distillato'ria.* The stems when fully developed are long, slender, and branched, scrambling to the height of three or four yards above the ground, and provided with abundance of sessile green leaves, every one of which bears a little pitcher at the extremity. The leaf, pitcher included, is altogether about a foot and a half in length. For the first 4 or 5 inches it is flat, about an inch across in the middle, tapering to each end, and in substance thick and leathery. Then it becomes a cylindrical and cord-like stalk of 3—4 inches in length, and more or less twisted and curled like a tendril. After this it changes again, the cord-like stalk becoming distended into a tubular cup, deep, long, and wide enough to admit the finger, and with a rim that resembles the needle-work round a button-hole. Lastly, there is a circular lid, as broad as the mouth of the pitcher, and articulated to the edge by a delicate hinge, like the cover of a hot-water-jug. The twisting and curling of the cord-like portion serve to keep the pitcher upright, and thus to prevent the watery fluid, with which it is usually half-filled, from running out. The flowers are green and unattractive, tetramerous and diœcious, the stamens of the males, which grow in spikes about as long as the leaves, united by their filaments into a column, on the summit of which is a head of about 16 anthers. The stems (as in all the genus) abound with spiral vessels, more so perhaps than any other Exogens, but are destitute of concentric zones.

Besides the *distillato'ria*, there are now in choice conservatories, extraordinary and magnificent species with pitchers of much greater size, and of splendid colours, and often fringed down the back with long hairs. Such are *Nepen'thes Rafflesia'na*, *sanguin'ea*, *lana'ta*, *Hooke'ri*, and *ampulla'cea*. There are also a few hybrids, as *Nepen'thes Dominia'na.*

Why Linnæus applied the ancient Homeric name Nepenthes to this genus does not appear. The nepenthe of the Odyssey was something adapted to dispel care; but no virtue of this nature appears to reside in the pitcher-plants, unless it be in the influence upon the mind which such wonderful vegetable structure may reasonably be supposed to possess. Since it is Helen, the wife of Menelaus, who is represented as pouring it out, the poet may elegantly intend by nepenthe the influence of female tenderness and beauty; on the other hand, if some preparation from a plant be really spoken of, it is not difficult to connect it with one of the many "drowsy syrups of the East."

CLXI. THE MENISPERMUM FAMILY.—*Menisperma'ceæ.*

Climbing shrubs, common in the woods of tropical Asia and America, noted for their narcotic and bitter qualities, but of trifling merit as garden ornaments, except in their foliage. The leaves are alternate, simple and entire, generally broad and angular; the flowers insignificant, mostly racemose, greenish-yellow, diœcious, and usually trimerous, with three times as many stamens as petals, the former hypogynous and often monadelphous. Fruit usually baccate.

Jateorhi'za palma'ta, (Bot. Mag. lvii. 2970.) a plant with the habit of Bryony, supplies the well-known drug called "calumba-root."—*Cissam'pelos Parei'ra* gives "Pareira brava." The celebrated berries called "Cocculus Indicus" are the produce of *Anamir'ta panicula'ta.* Besides these, there are occasionally seen *Menisper'mum Canaden'se*, (xliv. 1910.) *Coscin'ium fenestra'tum*, (lxxviii. 4658.) and *Coc'culus Caroli'nus.*

Similar in habit and aspect, and differing in little more than some peculiarities of the seeds and ovaries, are the two small families called *Lardizabala'ceæ* and *Schizandra'ceæ.* The former is distinguished by the ternate and quinate leaves, as in *Ake'bia quina'ta,* a pretty and hardy climber from China, with little racemes of dark-brown and fragrant flowers; and in the *Lardizaba'la biterna'ta* (lxxvi. 4501.) the flowers of which are dark purplish-chocolate colour. The leaves of this last are evergreen, and the leaflets have one or two teeth on each side. The *Schizandra'ceæ* are represented in British collections by the *Schizan'dra coccin'ea,* from North America, (xxxiv. 1413.) a climbing deciduous shrub with axillary clusters of scarlet flowers; and the *Sphærostem'ma propin'quum,* (lxxvii. 4614.) from Nepal, the flowers of which are yellowish-orange. The leaves in these latter plants are simple and undivided.

CLXII. THE NUTMEG FAMILY.—*Myristica'ceæ.*

Tropical trees, chiefly belonging to India, in several cases remarkable for their aromatic products, and especially so in that of the celebrated plant which yields both nutmegs and mace. This, perhaps the only representative in cultivation, is the *Myris'tica moscha'ta,* a native of the Moluccas, in 4° 30′ south latitude, where it blossoms and fruits all the year round. In stature it attains a height of 20—25 feet. The leaves are ovate-elliptical, 3—6 inches long, pointed, glabrous, entire, and alternate. The flowers are diœcious, small and yellowish, in form like those of the lily-of-the-valley, 3—4-toothed, and in texture thick and fleshy. Those of the male tree grow in little axillary clusters of 3—5, and have about ten stamens, the filaments of which are united into a column; those of the female are mostly solitary, and contain a short and solitary pistil. When ripe, this latter becomes the far-famed fruit—a beautiful apple-form but perfectly spherical drupe, 2—3 inches in diameter. When quite mature, it cracks open, separating vertically into two large valves, the substance of which is fleshy and yellowish, and from one-third of to half an inch in thickness. In the centre lies the nutmeg, consisting of a brown shell, with the aromatic kernel inside; and overlaid with a network of broad interlacing brilliant scarlet sprays, called the "arillus"—an extra part of very rare occurrence in fruits. When torn away, and dried, these sprays become horny, brittle, and brownish-yellow, constituting the "mace" of the spice-box. The combination in a single fruit of two such widely different products, is probably without a parallel in nature.

CLASS II.—ENDOGENS.

SECTION 1.—PETALOID.

CLXIII. THE LILY FAMILY.—*Lilia'ceæ.*

Foremost among the Endogens, as known to Britain in the wild state, and as flowers of the garden and conservatory, are the incomparable forms which have their type in the lily. Many endogenous plants, however, are like lilies in general figure, and are popularly spoken of as lilies, which yet by no means correspond with the lily as defined by botanists. Nor is this all. The popular idea of a lily comprehends not only all Endogens that have lily-like flowers and foliage, but certain plants that have only a fancied resemblance to lilies, such as the Nymphæaceæ, or "water-lilies," among Exogens. It becomes important, therefore, to discriminate carefully between the two or even three senses in which

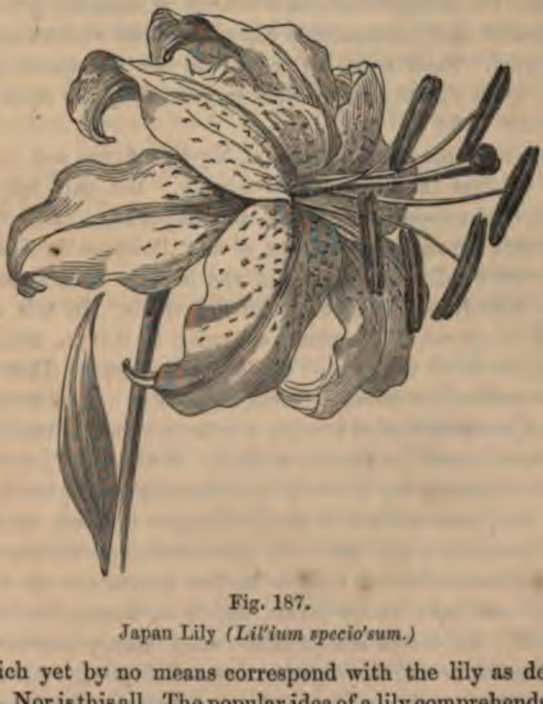

Fig. 187.
Japan Lily *(Lil'ium specio'sum.)*

the name is apt to be used, and to bear in mind that it applies properly only to particular members of the family we are about to describe. Included in this are several genera that have far less external resemblance to lilies than some of those which, upon technical grounds, are excluded, such as asparagus and the butchers' broom, which is a shrub with prickly leaves. No plants have ever attracted admiration so great and enthusiastic as the liliaceous tribes. They live in the poetry of every age and every nation; they carry the regalia of the kingdom of flowers; the highest and holiest teaching the world has ever known, enjoins us to "consider the lilies of the field."

Whether "lilies," in the scriptural allusion, may not signify flowers in general, may, however, be reasonably inquired. Viewed in the latter sense, the passage acquires a fullness of meaning proportionate to the occasion, and incomparably superior to that which restricts it to a single kind. Such a use of terms was not infrequent in ancient times, as when Pindar calls flowers in general by the name of roses. (Isth. iii. 34—36.)

The families containing species of lily-like figure and aspect, are probably not less than a dozen in number. But only four of these families are of considerable extent and importance, and it is these four only that are ordinarily spoken of as "liliaceous." They are the Liliaceæ, technically so called, and the families named respectively after the snowdrop, the crocus, and the orchis. In this quadruple alliance meet almost all the plants occurring in Britain, either wild or cultivated, in which the idea of the lily is expressed. There are very important differences between them, especially in the flowers; they correspond, nevertheless, in so many particulars that, at the outset, it is advantageous to consider them as a whole. With scarcely an exception, they are herbaceous, low-growing, and succulent; they are never truly aquatic; they very commonly have bulbous or tuberous roots, so that perennial duration is the rule; the flower-stems are for the most part annual, and usually either leafy or leafless scapes, though a few have branching and even woody stems, which in some kinds twine like honeysuckle; the leaves are parallel-veined, mostly alternate, and in almost all cases narrow, varying from linear to elliptical,—always entire, seldom provided with petioles, and never articulated to the stem, so that when they wither, instead of a scar, there remains a stump. In inflorescence they vary considerably; there is great diversity also in the figure and dimensions of the perianth, but in general complexion the flowers are remarkable for similarity, and excepting among the orchids, almost always symmetrical and 6-rayed. The calyx and corolla consist each of three pieces, which usually correspond in size and colour, and also in texture, the substance of both being delicate and generally succulent, and the surface often satiny. Sometimes all six pieces are quite free; in other cases they are united for half their length, or nearly to the summit, but they never form an inner and outer tube, such as occurs in dichlamydeous Exogens. The stamens are normally six; the ovary is invariably solitary; the fruit is generally capsular, and the seeds are usually numerous.

The only important deviations from these characters are found in the 4-cleft flowers of certain species of *Smilaci'na ;* in the *quasi*-netveined leaves of the dog's-tooth-lily and a few others; and in the condition of the stamens and pistil in the orchids. Further agreement is found, on the other hand, in the very general fragrance of the flowers, and in their appearance, for the most part, in spring and early summer.

Taking in the next place the differential characters of these four great families, they are found to lie in the following small compass :—

- A. Ovary superior. Stamens six. Flowers always regular. LILY FAMILY.
- B. Ovary inferior.
  - *a.* Stamens and pistils distinct. Flowers usually regular.
    - Stamens three. CROCUS FAMILY.
    - Stamens six. SNOWDROP FAMILY.
  - *b.* Stamens and pistil consolidated. Flowers always irregular. ORCHIS FAMILY.

The true Liliaceæ probably amount to at least 2,000, and are diffused very generally in temperate countries, where, with one or two exceptions, they are herbaceous; the fewer kinds belonging to the tropics, often manifest a tendency to become tree-like. The essential characters are:—Flowers always regular; stamens six, inserted upon the sepals and petals, one to each, with their anthers opening inwards; ovary free, superior, and 3-celled; styles coherent into a single pillar; stigmas three, more or less combined; fruit usually a dry, 3-celled, many-seeded capsule, bursting into three valves when ripe, and discharging the numerous seeds; testa either black and brittle, or brownish and membranous. A few genera have succulent and indehiscent fruit, and are by some botanists distinguished as *Asparaga'ceæ.*

Thirty grow wild in Britain, several of them ascertained recently. *Scil'la bifo'lia* (E. B. i. 24.) is not now reckoned a native plant. Two or three of the E. B. species of *Al'lium* are only varieties. *Al'lium ambig'uum* (Supp. iii. 2803.) has no claim to be inserted.

A.

STEM BRANCHED AND LEAFY. Flowers greenish or pale, small and inconspicuous, 6-parted, and often unisexual by deficiency. Fruit a bright red berry, the size of a pea.

A. Stem annual, herbaceous, usually erect, 1—3 feet high, and branching like a little fir-tree, the general figure of the plant pyramidal. Leaves bristle-shaped and clustered. Flowers axillary, 2—3 together. 28. ASPARAGUS.

B. Evergreen and woody shrub, the branches lasting two years. Leaves ovate-elliptical, about an inch long, deep-green, sharply-pointed, and turned edgeways through being twisted at the base. Flowers apparently seated upon the middle of the leaf, the pedicel being adherent. Filaments forming an ovoid tube. 29. BUTCHERS'-BROOM.

B.

FLOWER-STEM SIMPLE.

A. Flowers in terminal umbels or heads, which are enclosed, while young, in a whitish and semi-transparent sheath of usually two valves. Scent of the plant powerfully alliaceous. Perianth star-shaped. Stamens six. Roots bulbous.

* Umbels flat or convex. Flowers *white*.

Leaves broadly-lanceolate, 6—12 inches long, and 1—4 inches across where widest. Flower-stems 9 inches high. Ovary green and 3-lobed. 10. COMMON SYLVAN GARLIC.

Leaves linear and angularly-folded. 11. WHITE GUERNSEY GARLIC.

** Umbels nearly globular. Flowers *pink or purplish*, often with bulbs intermixed.

† Stamens all subulate and entire. Leaves tubular.

Flowers on long pedicels; pink, streaked with green and red, and with a few bulbs among them. Sheath longer than the umbel, and one of the valves much attenuated. Stem slender, 2—3 feet high. Leaves semi-cylindrical. 16. FIELD GARLIC.

Flowers in compact heads, fine purplish red, and without intermixture of bulbs. Leaves cylindrical, erect, tufted, 6—8 inches high. Flower-stalk the same height. (A seaside variety 2 feet high.) 17. CHIVES.

†† Three inner stamens flattened and 3-pointed, the middle point bearing the anther.

a. Leaves long and slender, and flat or keeled.

Stamens exserted. Heads very large, rarely with bulbs. Flowers innumerable. Leaves nearly an inch broad. Stem 2—3—6 feet high. 14. GREAT ROUND-HEADED GARLIC.

Stamens not longer than the perianth. Heads small, with numerous deep-purple bulbs. Flowers few. Stem 2—3 feet high. 15. SAND GARLIC.

(FLOWER-STEM SIMPLE. Flowers in umbels or heads. Scent alliaceous. Perianth star-shaped, and *pink* or *purplish*. Stamens six; three inner ones flattened and 3-pointed, the middle point bearing the anther.

b. Leaves cylindrical or nearly so, hollow, and usually faded when the flowers appear. Stamens exserted. Stem 1—2 feet high.

Bulbs among the flowers; the latter much fewer than the bulbs (which generally sprout before they fall), and very often totally absent. 13. CROW GARLIC.

No bulbs among the flowers.
12. SMALL ROUND-HEADED GARLIC.

B. No sheath to the flowers, which are either solitary, or in racemes, spikes, panicles, or corymbs. *Stem leafy.*

* Flowers yellow or greenish-yellow. Stamens six. Fruit capsular.

† *Flower terminal and solitary*, large, drooping before expansion, and sweet-scented. Sepals green at the base. Stigma sessile and acutely triangular. Anthers yellow. Leaves few, 6—12 inches long. Stem a foot high. 4. ENGLISH TULIP.

†† *Flowers clustered at the summit of the stem.*

a. Filaments of the stamens covered with yellow hairs, and the anthers scarlet. Flowers half an inch across, star-shaped, spreading widely, and forming a terminal and erect raceme 1—3 inches in length. Stem 3—12 inches high, stiff, decumbent at the base. Leaves narrow, 3—6 inches long, flat, and curved like a scimitar.
30. LANCASHIRE ASPHODEL.

b. Filaments of the stamens glabrous.

Stem 4—6 inches high, with one long and linear radical leaf, and 2 or 3 unequal leaves near the top, just below the flowers, which are small, umbellate, 3—4—6 in number, upon peduncles of different lengths, greenish outside, and scentless. 9. GAGEA.

Stem 1—2 feet high, abundantly clothed with linear-lanceolate and scattered leaves. Flowers several, large and handsome, pendulous, strongly scented, yellow with black dots, the segments recurved.
2. PYRENEAN LILY.

** Flowers not yellow.

† Flowers axillary, either solitary or 2—8 together, and half-pendulous: the perianth tubular, white, tipped with green, tardily deciduous, and articulated to the pedicel. Stamens six. Berries usually blackish-purple.

a. Leaves in many whorls of 3—4 below, 6—7 above, linear-lanceolate, and 3—4 inches long. Stem 1—2 feet high. Peduncles 2—4 flowered.
27. WHORLED SOLOMON'S-SEAL.

(FLOWER-STEM SIMPLE. No sheath. *Stem leafy.* Flowers not yellow. Peduncles axillary.)

b. Leaves alternate, broadly-elliptical, 3—6 inches long.

Stem cylindrical, nearly 2 feet high, the upper part inclining to one side, so as to form half a gothic arch. Leaves turning upwards in two ranks, the flowers in clusters of 2—6 to every leaf, and hanging below. Corolla narrowed in the middle. Stamens downy. 25. COMMON SOLOMON'S-SEAL.

Stem angular, 12—18 inches high, a little curved at the upper part. Flowers mostly solitary, not narrowed in the middle. Stamens glabrous. 26. SMALL SOLOMON'S-SEAL.

†† Flowers solitary and terminal (rarely 2—3.) Stamens six.

Flower pendulous, bell-shaped, the size of a large gooseberry, formed of six distinct pieces, which have the points inflexed, and are regularly chequered with dull and light red; occasionally cream-colour, but still faintly chequered. Stem slender, 12—15 inches high, and with 3—4 linear leaves at the upper part. 3. SNAKE'S-HEAD LILY.

Flower not more than half an inch across, white, veined with red or green. Stem 3—4 inches high, shorter than the few radical leaves. 5. LLOYDIA.

††† Flowers in erect racemes or panicles.

a. Plant 6—8 inches high. Flowers white.

Corolla 6-parted, globose-bell-shaped, the mouth circular, and the segments reflexed. Stamens six. Flowers in an erect raceme, mostly unilateral, hanging like drops of pearl, snow-white, and very fragrant. Leaves 2—3, erect, elliptical, 3—6 inches long, glabrous, pointed, and stalked, the long petioles sheathing at the base so as to resemble a stem. Berries scarlet. Flowers rarely pink. 24. LILY-OF-THE-VALLEY.

Corolla 4-parted to the base, small, and the segments reflexed. Stamens four. Flowers few. Leaves two, deeply cordate, pointed, and on short petioles. Stem bent where the leaves originate. 23. MAIANTHEMUM.

b. Stem 1—3 feet high. Leaves whorled, ellipticate-lanceolate, and spreading. Flowers racemose, pendulous, large and handsome, bell-shaped, violet flesh-colour, with dark-purple spots, the six segments free and reflexed. Stamens six. 1. PURPLE TURK'S-CAP LILY.

c. No spathe to the flowers, which are either racemose, or in heads, corymbs, or panicles. *Flower-stem leafless.*

* Flowers yellow, greenish outside, scentless, and borne in a little terminal corymb, with 2—3 long leaf-like bracts immediately beneath it; the peduncles of various lengths. Stem 4—8 inches high. 9. GAGEA.

(FLOWER-STEM SIMPLE, *and leafless.* No sheath to the flowers, which are either racemose, or in heads, corymbs, or panicles.)

- ** Flowers blue, purple, white, or flesh-coloured.
  - † Leaves elliptical, an inch or more across where widest. Flowers in an erect and unilateral raceme, small, white and very fragrant. Plant 6—8 inches high. 24. LILY-OF-THE-VALLEY.
  - †† Leaves not exceeding half an inch across, and usually very narrow.
    - *a. Flowers globular,* deep-blue, resembling little berries, whitish at the orifice, and clustered in a dense, terminal, and ovoid head. Flower-stalk 4—12 inches high, usually shorter than the numerous leaves. 21. GRAPE-HYACINTH.
    - *b. Flowers tubular,* nearly an inch long, and forming a terminal raceme of 3—6—12, the upper part pendulous, and all the flowers pendulous when full-blown. Perianth formed of six distinct but connivent pieces, with the points recurved. Stamens adherent to the petals. Two narrow blue bracts under every pedicel. Flower-stalk 6—18 inches high, cylindrical, and brittle. 20. BLUEBELL.
    - *c. Flowers in very long, tall, and erect racemes,* the stem rising 2—4—6 feet high. Leaves linear, very long, withering before the flowers appear. Pedicels barely an inch long, spreading at first, afterwards erect. Flowers small and greenish-white. 8. PYRENEAN STAR-OF-BETHLEHEM.
    - *d. Filaments of the stamens woolly.* Flowers few, purple externally, white on the inside, panicled, and jointed to their pedicels. 22. SIMETHIS.
    - *e. Filaments of the stamens dilated.* Plant 6—12 inches high; the roots bulbous.
      - Flowers corymbose, erect, the lower peduncles longer than the inner ones. Filaments simple. Flowers brilliant enamelled white inside, externally with a vivid green stripe, and opening only in sunshine. 6. COMMON STAR-OF-BETHLEHEM.
      - Flowers pendulous, in a nearly unilateral cluster. Filaments trifid, the middle point bearing the anther. Petals silvery glaucous white, greener outside. 7. DROOPING STAR-OF-BETHLEHEM.
    - *f. Filaments of the stamens subulate.* Flower-stalks 2—6 inches high. Leaves numerous. Flowers corymbose, star-shaped and inodorous. Roots bulbous.
      - Flowers with a bract under every pedicel; appearing in spring, usually blue, sometimes pink or white. 18. VERNAL SQUILL.
      - No bracts to the pedicels. Flowers rose-coloured, appearing in autumn, and in perfection before the leaves appear. 19. AUTUMNAL SQUILL.

HABITATS AND DISTRIBUTION.

1. Purple Turk's-cap Lily—*Lil'ium Mar'tagon.*

Plentiful in woods and copses at Ash, near Wrotham, Kent, the bulbs deep in the earth, and protected by a tough net-work of roots of oak, hazel, and maple. Also in Surrey, Herts, Essex, &c. Fl. May, June.

E. B. Supp. iii. 2799; Baxter, vi. 501; Bot. Mag. xxiii. 893, xxxix. 1634.

2. Pyrenean Lily—*Lil'ium Pyrena'icum.*

Hedgebanks between South Molton and Mollond, Devon, about a mile and a half from the latter place, in profusion. Indigenous? Fl. end of June.

Both this and the preceding are old garden-flowers.

3. Snake's-head Lily—*Fritilla'ria Melea'gris.*

Meadows, pastures, and woods, in the valley of the Thames and its various tributaries, often in extreme abundance. Meadows adjoining Oaksey Park, Wiltshire, covering in one place 16 acres of ground. Woods around Strathfieldsaye, and in the park, growing by tens of thousands. Near Reading, in profusion. At Minety, between Gloucester and Swindon, covering 25 acres of Oxford-clay (excepting patches two yards across, of wood-anemone), and by the rustics called "Too-ads' yeds" (toads' heads). Fl. April, May.

Curtis, i. 165; E. B. ix. 622; Baxter, i. 1.

Frequent in gardens, where the flowers often grow two or three together on the stem, and also vary, as in the wild state, to cream-colour.

4. English Tulip—*Tu'lipa sylves'tris.*

Chalk-pits, old quarries, among trees, and in meadows and pastures that are not disturbed; rare, and chiefly in the north and east of England, and in the south of Scotland. Under trees near the ruins of Pitcullo Castle, Fifeshire, in large patches. Valley of the Don, between Doncaster and Conisbro' Castle, the foliage conspicuous in the fields till the middle of May, when it gets hidden by the rising grass. Also in Norfolk, Suffolk, Hertfordshire, &c. Fl. April, May; but very rarely.

Curtis, iii. 473; E. B. i. 63; Baxter, i. 2.

5. Lloydia—*Lloyd'ia serot'ina.*

Mountains of North Wales; rare. Snowdon. Twll Du, the celebrated chasm near Llanberris. Glyder Fawr. Cwm Idwell, Caernarvonshire. Fl. June.

E. B. xii. 793; Baxter vi. 464 (both as *Anther'icum serot'inum).*

6. COMMON STAR-OF-BETHLEHEM—*Ornithog'alum umbella'tum.*

Meadows, pastures, and thickets; rare, though widely diffused, and suspected to be alien. But since floriculture commenced with the transfer of pretty wild-flowers to the garden, it is an argument in favour of a plant like the Star-of-Bethlehem being indigenous, rather than a runagate from cultivation, that it is exceedingly common in the flower-border, and especially in old gardens in the country. "Meadows near Thirsk, associated only with truly indigenous plants, over an acre of unbroken grazing-ground." "Pitchcrop Ham, near Worcester, abundant, but difficult to find, because growing in meadows that are soon cut, and the flowers are green on the outside." In Ireland not hitherto noticed. Fl. April, May.

Curtis, iii. 476; E. B. ii. 130; Baxter, ii. 124.

7. DROOPING STAR-OF-BETHLEHEM—*Ornithog'alum nu'tans.*

Meadows and orchards; rare, and almost confined to the south-east of England. Indigenous? Fl. April, May.

Curtis, iii. 475; E. B. xxviii. 1997; Bot. Mag. viii. 269.

Common in gardens, though by no means so frequent as the *umbella'tum.*

8. PYRENEAN ORNITHOGALUM—*Ornithog'alum Pyrena'icum.*

Woods and shady hedgebanks in the south and south-west of England. Very abundant near Bath. Fl. June, July.

E. B. vii. 499.

9. GAGEA—*Ga'gea lu'tea.*

Woods, thickets, and pastures, in many parts of England and the lowlands of Scotland, but rare. Hazel-copse, near Dumfries, abundant. Fl. March, April.

Curtis, iii. 474; E. B. i. 21 (both as *Ornithog'alum lu'teum*); Baxter, i. 41.

10. COMMON SYLVAN GARLIC—*Al'lium ursi'num.*

Moist woods and groves, often in such immense quantities as to exclude nearly everything else, and establish a disastrous empire; also on moist hedgebanks, along the grassy borders of damp fields, and even in meadows and pastures. Widely dispersed, though in some parts rather scarce. Fl. May, June.

E. B. ii. 122; Baxter, ii. 97.

A plant that would be charming but for the unbearable odour (which when it is trodden upon makes one recoil), the clear bright whiteness and abundant bloom catching the eye from a long distance. The leaves are apt to be mistaken for those of the lily-of-the-valley.

11. WHITE GUERNSEY GARLIC—*Al'lium trique'trum.*

Hedgebanks in Guernsey; abundant. Fl. May, June.

Kirkcudbrightshire, near the Urr. Still
Isle of Wight. Fl. June, July.

E. B. xxviii. 19

14. GREAT ROUND-HEADED GARLIC-

Dry waste places, generally in the neig
Rare, and probably only as a descendant
August.

E. B. xxiv. 1657.

Al'lium Babingto'nii (E. B. Supp. iv. 2906.) ap
differing only in the predominance of sessile b

15. SAND GARLIC—*Al'lium*

Mountainous woods and fields, where t
in the north of England and the lowlands

E. B. Supp. iv. 2

The E. B. *arena'rium* (xix. 1358.) has some
but what is really meant is quite obscure.

16. FIELD GARLIC—*Al'l*

Borders of dry fields, chiefly, but not
tifully in the salt soil of the banks of the
though widely scattered. Fl. July, Au

E. B. vii. 488

Al'lium carina'tum (E. B. xxiv. 1658.) diffe
instead of semi-cylindrical.

17. CHIVES—*Al'lium S*

Meadows and pastures: rare. Nort

18. VERNAL SQUILL—*Scil'la ver'na.*

Banks and rocky places upon the coast. Abundant in many parts of the west and north of Great Britain, extending from St. Ives to the Shetland Isles. Plentiful in the Isle-of-Man; equally so upon the eastern coast of Ireland, and at Staffa and Iona. Fl. April, May.

E. B. i. 23.

19. AUTUMNAL SQUILL—*Scil'la autumna'lis.*

Dry pastures, and waste and rocky ground in the south and south-west of England; rare. Fl. August, September, attaining perfection before the leaves appear.

Curtis, ii. 389; E. B. ii. 78; Bot. Mag. xxxiii. 919.

20. BLUEBELL—*Hyacin'thus non-scrip'tus.*

Woods, groves, and hedgebanks; everywhere, and generally in great profusion. Fl. early spring, and in mountainous districts often continuing till May and June.

Curtis, i. 90; E. B. vi. 377 (as *Scil'la nu'tans*); Baxter, i. 71.

The prettiest view of bluebells is early on a fine May morning, when the sun shines *under* the young leaves of the trees that overshadow them, thus between the blue and green, and illuminating both. Seen from a distance, and half-hidden in the wood, their unbroken sheets of bloom might be mistaken for a lake of water. The white variety is not rare; the flesh-coloured rather more so. Both of these last are commonly cultivated in gardens. Seeds are produced abundantly: while young, they are semi-transparent, and resemble tiny pearls; when ripe, they are intensely black, and glisten like the eyes of little birds. The capsule in all its stages is instructive, and should be carefully examined by the student of plants.

Non-scrip'tus, the good old name given by Dodonæus, marks the distinction between this simple northern plant and the true hyacinth—that famous and classic flower which the ancient poets call the "inscribed," and which still bears upon its petals, though somewhat faintly, it must be confessed, the AI, AI, of the unlucky and disconsolate god. The Bluebell of Scotland is the *Campan'ula heterophyl'la*, concerning which see p. 478.

21. GRAPE-HYACINTH—*Musca'ri racemo'sum.*

In profusion over a considerable extent of sandy ground and in fallow fields at Cavenham, eight miles north-west of Bury, Suffolk, certainly indigenous, and quite a weed. Also found at Pakenham and Hengrave, in Oxfordshire; in many places in Cambridgeshire, and on the banks of the Blackwater, near Fermoy, Ireland. Fl. April, May.

E. B. xxvii. 1931 (as *Hyacin'thus racemo'sus*); Baxter, ii. 92.

Common in gardens, where it varies with white flowers.

22. SIMETHIS—*Sime'this bi'color.*

Upon a sandy heath about two miles from Bournmouth, Dorset (now planted with firs); and upon hills by the seaside, near Derrynane Abbey, Kerry, the seat of the O'Connells. Fl. May, June.

E. B. Supp. iv. 2952.

23. Maianthemum—*Maian'themum bifo'lium.*

Woods upon the escarpment of the eastern calcareous range on the slope of Hulton-Bushel moor, near Everlep, north-west Yorkshire, scattered over a space of ground 90 yards in length, and certainly indigenous. Also in Middlesex, Bedfordshire, &c., generally growing under fir-trees, as in Switzerland, but questionably wild. In Queen Elizabeth's time, near Preston. Fl. May.

Bot. Mag. xv. 510 (as *Convalla'ria bifo'lia.*)

24. Lily-of-the-Valley—*Convalla'ria maja'lis.*

Woods, thickets, and shady places; in England not rare, though rather local, and where found, very plentiful. Also in Scotland, but in Ireland only where planted. Near Matlock, in profusion. Fl. May, the *flos gratissimus* alike of the season and of our island.

Curtis, ii. 316; E. B. xv. 1035; Baxter, i. 78.

Universal in gardens, and forced, in large quantities, by the purveyors of ladies' spring bouquets. I have had the flowers presented to me in Manchester on New-year's Day.

25. Common Solomon's-Seal—*Polygona'tum multiflo'rum.*

Woods; rather uncommon, though widely scattered. Abundant in many of the dense oak-woods about Tytherly, Hants. Found also in the southern parts of Scotland, but not in Ireland. Fl. May.

Curtis, iii. 478; E. B. iv. 279 (both as *Convalla'ria multiflo'ra).*

A handsome and very singular plant, common in gardens, especially in those of cottagers, where it is often seen growing in dense patches of twenty or thirty arching stems, and frequently bears abundance of purple berries.

26. Small Solomon's-Seal—*Polygona'tum officina'le.*

Woods; rare, and in Britain restricted to a few of the English counties, and to a few counties in South Wales. Yorkshire. Leigh woods, near Bristol. Southam, near Cheltenham. Fl. May, June.

Curtis, iii. 479; E. B. iv. 280 (both as *Convalla'ria Polygona'tum*).

27. Whorled Solomon's-Seal—*Polygona'tum verticilla'tum.*

Woods and shady glens; very rare, and almost confined to Scotland. Perthshire, near Dunkeld. Bellingham, Northumberland. Fl. June.

E. B. ii. 128 (as *Convalla'ria verticilla'ta).*

28. Wild Asparagus—*Aspa'ragus officina'lis.*

Sea-coasts, and banks of tidal rivers, especially where muddy; sometimes in dry places among grass. Rare, and only found in the south and west. Cornwall. Anglesea. Banks of the Avon, below Bristol. County Waterford, Ireland. Fl. July, August.

E. B. v. 339; Baxter, vi. 403.

Cultivated, as an esculent, since the time of the Romans.

29. Butchers' Broom—*Rus'cus aculea'tus.*

Woods, thickets, and rough waste places, among bushes; in the south of England often very abundant; found also, occasionally, in some parts of Scotland, but not in Ireland. In the New Forest, at the foot of every beech. Isle of Wight, abundant. Channel Islands (except Sark), very abundant, in hedges, and upon the hill-sides, often growing among furze. Fl. March, April.

E. B. viii. 560; Baxter, vi. 474.

Very common in gardens, but in the north producing only flowers. In the south, the bright-scarlet and shining berries make a fine appearance throughout the winter, though falling soon if the plant be handled, and not infrequently may be seen, like those of holly, among the evergreens used for decking churches at Christmas. Called "Butchers' broom" because the branches are used for driving away flies, and impaling such as the points of the leaves may happen to catch.

30. Lancashire Asphodel—*Narthe'cium Ossif'ragum.*

Wet moors and peat-bogs; abundant wherever such habitats give invitation. Everywhere on the moors in the New Forest. Very abundant near Manchester. Fl. July, August.

Curtis, iii. 477; E. B. viii. 535; Baxter, iii. 186.

One of the most beautiful plants the moorlands produce, and coming into perfection just as the Droseras decline. With these latter and the *Eri'ca Tet'ralix* it forms the most pleasing feature in the swamp-heatherland florula. By some authors it is classed with the rushes.

The garden and greenhouse Liliaceæ more or less frequently met with amount, probably, to nearly a thousand; a very large proportion, however, being bulbous plants that require the protection of glass, there are few private collections in which the family is even copiously represented, and the generality of cultivators concern themselves only with species that present claims to especial regard. Of these last there are about a hundred. They are resolvable into six principal, and four or five subordinate groups.

Section I.—*Ver'satiles.*

These have flowers for the most part of large size, and gaily coloured; the sepals and petals, and the ovary, are perfectly free; the filaments of the stamens are usually thick and hard, and with fine-drawn points upon which the anthers are elegantly balanced or "versatile," so as to swing to and fro; the fruit is a dry capsule; and the roots are usually bulbous. Foremost among them, and exhibiting the sectional as well as the ordinal characters in perfection, are the lilies truly and properly so called, with, in the front rank, that grand old queenly flower, the common white lily or *Lil'ium can'didum,* (Bot. Mag. viii. 278.) the flower selected, on account of its chastity and sweet odour, for the hand of the Madonna. Elevated, 4—8 together, on a stem a yard high, the large half-pendulous bells, which are of that moulded and solid aspect well called "waxen," seem, when the sun shines, actually luminous in their own substance.

The virgin lilies in their white,
Seem clad but with the lawn of almost naked light.

indigenous purple martagon, but
lilies for which we are indebted to Japan.
specio'sum or *lancifo'lium*, (Fig. 187.) blooms
large and recurved sepals and petals either p
elegantly flecked with deep crimson points, and
suspended so lightly that the least rude hand
porticos, and verandahs, in late summer an
the most admirable plants in nature: it wil
little protected. *Lil'ium aura'tum*, the "gilded
The flower, borne on a stem 2 feet high, is sa
and inclined gracefully forwards; the sepals a
translucent substance, and up the centre of ev
shining and satiny gold—not simple yellow, but
ally dissolves into the ivory plain on either han
tip, while on both sides are scattered brown or
bles that of orange-blossom, and though de
large apartment. This matchless flower is s
and though at present in few hands, will do
Other magnificent lilies have been brought of
are fast becoming diffused over the country,
When in bloom, this majestic plant is aloe-l
dance of large ovate-cordate leaves, and a gr
white flowers, every segment striped with p
perceptible in every part of the conservatory.

To the Versatiles belong also the tulip and
garden tulip, *Tu'lipa Gesneria'na*, is a native
of the earliest flowers introduced into Englis
plant that its fine and diversified colours are
years old, the flowers of the seedlings being p
are of one colour only are called "Selfs;" wh

is *Tu'lipa suave'olens.* *Tu'lipa Celsia'na,* (xix. 717.) *Tu'lipa Clusia'na,* (xxxiv. 1930.) and some others, are also grown, chiefly on account of their neat simplicity. Of the crown-imperial (*Fritilla'ria imperia'lis*), there can scarcely be a garden without a specimen. This handsome plant bears a ring of large tulip-like and pendulous yellow or copper-coloured flowers at the summit of a leafy stem 2 feet high, the numerous terminal leaves forming an erect green tuft immediately over them. At the base of every sepal and petal, on the inside, is a white and concave nectary filled with honey, so that looking into the flower it seems to possess six great round eyes. Many others of the genus are common, as the Persian Fritillary, (*F. Per'sica,* xxxvii. 1537.) the common snake's-head lily, described among the British plants, and the toad-lily or *F. ni'gra* (xviii. 664.) The dog's-tooth lily (*Erythro'nium Dens-ca'nis,* i. 5.) is a lovely little spring flower with two or three ovate-lanceolate leaves marbled with purple, and a solitary lilac or white and pendulous blossom. *Erythro'nium America'num* (xxviii. 1113.) is similar in form, but smaller and yellow. *Calochor'tus* and *Iphigeni'a* are beautiful greenhouse plants. *Glorio'sa, Methon'ica,* and *Clinosty'lis* are splendid climbers from the eastern tropics, with wide-spreading red, golden, or orange-coloured flowers 2—3 inches across, and often with the leaves tapering into tendrils. The last-named very curious condition occurs also in the *Fritilla'ria leucan'tha* (lviii. 3083.)

SECTION II.—*Hemerocallid'eæ.*

These have the calyx and corolla so united as to form a long and conspicuous tube, the extremities of the segments alone remaining free. The fruit is a dry capsule, and the roots are generally fibrous. The true day-lilies are extremely old-fashioned plants, and very common, especially the yellow day-lily, *Hemerocal'lis fla'va,* (i. 19.) a native of Siberia, and generally growing in large clumps. The flower-stems are about 18 inches high; and the vase-like blossoms about an inch and a half across at the margin. Belying their name, they usually last for several days. The lilac and purple day-lilies are now distinguished under the name of *Funck'ia.* Like the yellow, they are hardy border flowers, common, and known by their large, broad, ovate, and strongly-ribbed leaves, racemes of half-pendulous flowers with declinate stamens that curve upwards at the extremity, abundance of ovate and leafy bracts, and pendulous capsules of long thin black seeds. *F. cœru'lea* (xxiii. 894.) is Japanese. The celebrated Tuberose, *Polian'thes tubero'sa* (xliii. 1817.) is an old-fashioned East Indian plant growing 4—5 feet high, and bearing a terminal cluster of powerfully-scented white blossoms, which are often double. *Trito'ma Uva'ria,* (xx. 758.) from the Cape of Good Hope in 1807, a splendid, very common, and hardy plant, sends up tall stems that terminate in long, dense, ovoid, and cylindrical heads of tubular and pendulous flowers the colour of fire. *Veltheim'ias,* (xiv. 501; xxvii. 1091.) also from the Cape, are of similar figure, bearing their pink and green pendulous tubes in copious terminal racemes, but are not so tall. From the same country comes the old-fashioned, lovely, and universal *Agapan'thus,* (xiv. 500.) the naked flower-stalk of which rises 2 or 3 feet high, and bears a large blue umbel upon the summit. *Blandfor'dias* are rare and beautiful New Holland plants with racemose umbels of orange or cream-coloured flowers. *Phor'mium te'nax,* (lx. 3199.) the celebrated plant from which New Zealand-flax is manufactured, in general aspect resembles the great American aloe, but has white, instead of yellow flowers. Planted on the margins of ornamental waters, this noble plant becomes highly effective, and in winter needs but little protection.

SECTION III.—*Aloi'neæ.*

These comprise the very singular plants called Aloes, and the magnificent and chiefly American genus *Yuc'ca*, popularly called "Adam's needle." Aloes, to the number of 100 species, are almost wholly from the Cape of Good Hope, though *Aloe vulga'ris*, the species which supplies a large portion of the medicinal drug called aloes, is indigenous to the Levant. Some species are almost arborescent, others shrubby, but as seen in England, they are low plants with densely rosetted or 2-ranked tufts of thick, hard, rounded, and fleshy leaves that are sometimes mottled with light green or white; and tall, thin, naked flower-stalks terminating in racemes of half-pendulous and tubular blossoms an inch or two long, and the usual colour of which is red or orange. Half the number are figured in the early volumes of the "Botanical Magazine." In greenhouses two or three species are generally kept as curiosities, and it is not uncommon to see the hardier sorts in parlours and cottage-windows, especially the pretty "partridge-breast." (*Aloe variega'ta*, xv. 513.) The great "American aloe," *Aga've America'na*, is not, as the English name would imply, a plant of the genus before us, but belongs to the *Amaryllida'ceæ*. Yuccas were among the first plants brought to Europe from the New World. They are stout, massive, oriental-looking, plants, perfectly hardy, of quaint appearance, and form striking objects in garden scenery, especially when planted upon lawns, or in large vases. The stems are short and thick; the leaves very numerous, 2—3 feet long, 2—6 inches broad, stiff, and recurving at the upper part; the flowers resemble greenish-white tulips, and come out in enormous terminal panicles that rise to the height of several feet. Among the finest species are *Yuc'ca glorio'sa*, (xxxi. 1260.) *Yuc'ca filamento'sa*, (xxiii. 900.) *Yuc'ca angustifo'lia*, (xlviii. 2236.) and *Yuc'ca aloifo'lia*, (xli. 1700.) which last varies with yellow-striped leaves, and as a contrast to dark-green shrubs is, in the conservatory, almost invaluable. The internal structure of the stems of these plants closely resembles that of Exogens.

SECTION IV.—*Hyacin'thinæ.*

These, the most numerous of the Liliaceæ, have the sepals and petals more or less combined, but never so much so as to form a tube; the anthers are immoveable; the roots are bulbous, and the fruit is capsular, the seeds usually with a black and brittle testa. The matchless flower which gives name to the section, *Hyacin'thus orienta'lis*, is a native of south-western Asia, and is one of the oldest inhabitants of English gardens. The practice of growing it in glasses of water for parlour ornament, which dates from 1734, was one of the happiest ideas ever conceived in connection with flowers. A few shillings laid out judiciously in the bulbs, and a little taste in the arrangement of the glasses, will make the simplest apartment as bright as the Alhambra, and this during several of the dreariest weeks of winter, when this vegetable prism may be made to bloom no less deliciously than in the open air in May. Planted in pots of ordinary garden earth, the hyacinth will lift its grand and odorous spike long before Easter, and cheer the darkest and dullest back-sitting-room. Other and smaller species of the genus appear in the open borders, along with many of the lovely little plants called squills, most of which unfold their pretty racemes early in spring. The clear bright azure of *Scil'la Sibir'ica* (xxvi. 1025.) is almost unique; *Scil'la bifo'lia*, once reputed British, is usually deep-blue, but varies to white and pink. In the open border are likewise found many of the genus *Ornithog'alum* or "Star-of-Bethlehem," three British species of which have been described above, and all generally distinguished by their flattened anthers, and white flowers striped with green upon the outside. The indoor species, which are numerous, often have enormous onion-like bulbs, and racemes of flowers that rise at least a yard high. The onion itself is one of this race, representing perfectly the extensive genus *Al'lium*. The common onion, *Al'lium Cepa*, is probably a native of Egypt, but of such extremely ancient culture that its earliest history is quite unknown. The variety called *prolif'erum*, or the "tree-onion," (xxxvi. 1469.) is remarkable, like some of the wild English garlics, for bearing a clustered head of bulbs instead of the accustomed umbel of white flowers. Culinary garlic is *Al'lium sati'vum;* the shallot, properly "eschalot," *Al'lium Ascalon'icum;* and the leek, *Al'lium Por'rum;*—the last a Swiss species apparently, though by some botanists deemed only a variety of the *Al'lium Ampelopra'sum*. The character of the roots seems to indicate genuine difference, though in other respects the two plants are certainly near allies. Few of this genus are cultivated for the sake of ornament, the odour rendering them distasteful when approached too near. *Al'lium Moly*, (xiv. 499.) however, is extremely common, and, in some places, almost disposed to become a colonist. The large broad leaves grow in dense tufts; the yellow flowers form large broad umbels, supported on scapes 12 inches high. Of the other out-door Hyacinthinæ the commonest and prettiest are the indigenous species above described, along with the blue *Scil'la campanula'ta*, (iv. 127; xxviii. 1102.) and the very curious plant called *Musca'ri como'sum* (iv. 133.) with its variety *monstro'sum*, which consists of numerous little blueish-purple bells suspended upon long peduncles, while the uppermost flowers are sessile. In the greenhouse the multiformity is truly beautiful. *Lachena'lias* have foliage like that of the meadow orchis, and scapes 6 inches high, with half-pendulous tubular blossoms that are usually red or yellowish, or with a lovely mixture of green, reminding us of the *Cor'rea specio'sa*, as in the *Lachena'lia tric'olor* and *lute'ola* (xli. 1704.) *Callipro'ra fla'va* has umbels of drooping yellow flowers. Those of the *Camas'sia esculen'ta* are rich purple, and nearly 2 inches in diameter. *Masso'nias* are queer plants with a couple of large broad leaves usually laid flat upon the ground, and compound umbels of white flowers, as in *Masso'nia murica'ta* and *latifo'lia* (xvi. 559; xxii. 848.) *Eu'comis bifo'lia* and its kindred (xxii. 840; xxiii. 913.) are similar to them in foliage, but have greenish flowers in dense heads, surmounted by a tuft of leaves. *Dri'mys altis'sima*, (xxvii. 1074.) *Triteleï'as*, *Mil'las*, *Ledebou'rias*, *Albu'cas*, and many others, principally from the Cape of Good Hope, swell the numbers of this very interesting group.

SECTION V.—*Asphodel'eæ.*

The flowers, anthers, and fruit of the Asphodeleæ resemble those of the Hyacinthinæ, but the roots are not bulbous. The typical genus is represented in handsome plants with tall spikes of white or yellow flowers, such as *Asphod'elus ramo'sus* and *Asphod'elus lu'teus*, (xxi. 799; xx. 773.) natives, like most of their race, of the borders of the Mediterranean. *Anther'icum* is a genus in which the flowers are usually white, and borne in erect racemes, as in the very common *Anther'icum Lilia'go* and *Lilias'trum*. The remainder of the section consists almost entirely of greenhouse plants, chiefly from Brazil, New South Wales, and

These, as stated above, are by some author
fruit, instead of capsular, being berry-form.
the stems last only a year or two ; others poss
and were it not that they are linked to the
the lily-of-the-valley and the Solomon's-seal, t
ably be objected to. Among the species pe
noted for their fine appearance, are various exo
as *Rus'cus androgy'nus,* (xliv. 1898 ; lvii. 30
called *Cordyli'ne,* (lv. 2835.) *Reineck'ia, Pincen*
the *Dracæ'nas.* The species of this last-nam
high, and produce long, broadly-lanceolate lea
colour, and so effective in contrast with gree
without them. The flowers are produced in ter
happens with plants famous for foliage, are s
Dra'co is the famous "Dragon-tree," a plant
be one of the grandest and oldest organic mo
also are referable *Convalla'ria, Smilaci'na, Pol*
and probably also *Luzuria'ga, Callix'ene,* and

The subordinate sections of the family con
except in very choice or large collections.
(li. 2496.) *Aphyllan'thes,* (xxviii. 1132.) *Ophi*
(xxxii. 1302 ; xxxvii. 1532.) and the singular "
are species of *Xanthorrhœ'a* (lxxix. 4722.) T
(xvii. 614, 616 ; xxvii. 1060.) are anomalous s
by some authors to the Hæmodoraceæ, but pr
The only common plant among these remanet
(li. 2499.) popularly valued for its foliage, the
handsomely ribboned with white. Though ofte

pletely fills up the middle of the perianth, extending from side to side, and in general figure and colour resembling the stigma-crown of a poppy. The ovary is embedded in the base of the pillar, and outside the flower are a few large, thin, ovate and transparent bracteas. Possibly this curious plant may be referable to the *Orontia'ceæ.*

CLXIV. THE SNOWDROP FAMILY.—*Amaryllida'ceæ.*

In general aspect, foliage, structure, and beautiful appearance, the members of this family closely agree with the Liliaceæ, the only essential difference consisting in the position of the perianth and stamens with regard to the ovary, which latter part in the Amaryllidaceæ is always "inferior." The stamens, except in the *Narcis'sus trian'drus*, are always six, and the anthers open down the inner side, by which circumstances the family is differentiated from the Iridaceæ. A very frequent characteristic is found in the large membranous and semi-pellucid sheath which encloses the flower-buds, and which often hangs permanently about the peduncles in brown and withered relics. This membranous envelope is termed the "spathe." On the whole, perhaps the Amaryllidaceæ are more uniformly herbaceous and succulent than the Lily-family, though, as in the latter, certain tropical species have tall, thick, and woody stems, and prodigious leaves. Excepting these last, all possess bulbous roots, and bear their flowers, ordinarily at least, upon annual scapes. Unlike nearly all other families of Endogens, the Amaryllids are in many

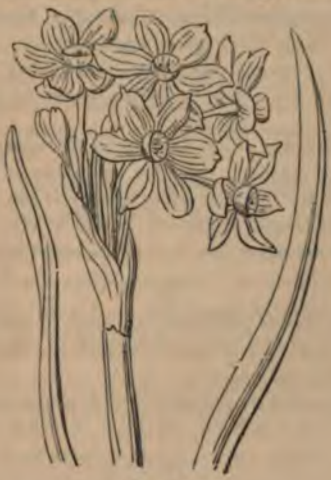

Fig. 188.
Polyanthus-narcissus.

or vase which surrounds the mouth of t
and dark green. Scape 9—12 inches lo

- * Flower pale yellow, half-pendulou
  as long as the petals, projectin
  plaited.
- ** Sepals and petals white; the cu
  crenate or ragged at the edge,
  lively colour. Flowers either s
  - Cup pure yellow. Flowers g
  - Cup usually white, and al

B.

**Petals and sepals in no degree connected, th
the six stamens, standing free upon the
shaped, white and pendulous.**

- **Sepals oblong, concave, and twice as
  and streaked with green. Scape
  blossom that is very curiously
  and afterwards swings lightly or
  linear, rather glaucous, and sc
  have withered.**
- **Sepals and petals all of the same siz
  green. Flowers 3—8 togeth
  Leaves 12—15 inches long.**

HABITATS AND DIS

1. DAFFODIL—*Narcis'sus*

Meadows, pastures, and groves, espe

2. PALE NARCISSUS—*Narcis'sus biflo'rus.*

Meadows, pastures, orchards, and grassy banks; not uncommon, but chiefly in the south and west of England, and in Ireland. Near Axbridge. Near Doncaster. Near Malvern. Isle of Wight. Fl. April, May.

E. B. ii. 276.

Common in gardens, especially with double flowers, when it is carnation-like and very fragrant, and popularly called "Sweet Nancy."

3. POETS' NARCISSUS—*Narcis'sus poet'icus.*

Meadows, pastures, and grassy banks; rare, and doubtfully indigenous. So plentiful in a locality near Fillongley, Warwickshire, that the neighbours call the spot the "Lily-field." Fl. May, June.

E. B. iv. 275.

Very common in gardens, both single and double. In the latter state, the crimson-edged cup is recapitulated as well as the petals, giving the flower a very beautiful variegation.

4. SNOWDROP—*Galan'thus niva'lis.*

Meadows and pastures, grassy banks, orchards and groves; in England common, though generally confined to given spots, and in such, for the most part, extremely plentiful; in Ireland and Scotland less usual. Fl. February, March, in company with the hazel-nut.

Curtis, iii. 472; E. B. i. 19; Baxter, i. 33.

Universal in gardens, where the flowers are often double, but then not so graceful. The morphological condition of the perianth is in the double flowers very instructive.

5. SNOWFLAKE—*Leuco'jum æsti'vum.*

Meadows, pastures, and grassy banks in the south-eastern counties of England, but rather uncommon. Fl. May, June.

Curtis, ii. 315; E. B. ix. 621; Baxter, i. 55.

Very commonly cultivated under the name of the "Summer Snowdrop."

The exotic Amaryllidaceæ which seem disposed to become colonists with us, are *Narcis'sus lobula'ris*, *Narcis'sus incomparab'ilis* (iv. 121.) and three or four others of the same beautiful genus. In the first is well shown the nature of the central cup, which represents in this genus a whorl of six abortive stamens, the anthers being undeveloped, while the filaments are immensely dilated, petaloid, and, except in the *lobula'ris*, united by their margins. In other respects this plant resembles the common daffodil, only that it is taller and more robust. *Narcis'sus incomparab'ilis* is the well-known cottage-garden flower called by rustics "Butter-and-eggs," a name given it on account of the delicate primrose-yellow or white of the sepals and petals, and the deep yolk-of-egg colour of the cup. It varies, like the others, with double flowers, and, when in that condition, is generally a greater favourite. All these plants, as well as the indigenous species, multiply chiefly by the production of lateral bulbs. Seed-capsules are very rare, as indeed throughout the family, sterility in which is often habitual.

To take the name of the famous shepherdess for such a race as the Amaryllids was at least a pretty fancy. The Liliaceæ themselves do not include plants more truly lovely, and in colouring some of them are scarcely surpassed by Orchids. The typical genus belongs chiefly to South America, whence come the splendid plants called the Belladonna-lily, the Barbadoes-lily, and the Mexican-lily, botanically *Amaryl'lis Belladon'na*, *Amaryl'lis eques'tris*, and *Amaryl'lis regi'næ*,—all with great red vase-like flowers, borne several together in an umbellate manner, on the summit of a stout, succulent, and hollow stem, two feet in height, the peduncles inclining sideways, so that the blossom is horizontal. These, the magnificent *auli'ca* from Rio Janeiro, (Bot. Mag. lvii. 2983.) now called *Hippeas'trum auli'cum*, and certain fine species from the Cape of Good Hope, have supplied an endless variety of hybrids, some of them far grander flowers than their parents, and worthy ornaments of every good conservatory. Of the smaller species the prettiest are the well known "Guernsey-lily," *Amaryl'lis* or *Neri'ne Sarnien'sis*, (ix. 294.) and the *Amaryl'lis* or *Neri'ne undula'ta* (xi. 369.) Perhaps the commonest is the "Jacobæa-lily," *Amaryl'lis formosis'sima*, (ii. xlvii.) easily told by its dark hue, and by the lower segments of the perianth being pendulous, so that the flower is rendered irregular. *Vallo'ta purpu'rea* (xxxv. 1430.) is also a great favourite, on account of the freedom with which it puts forth its scarlet vases. Of *white*-flowered Amaryllids the number is considerable. These belong chiefly to the splendid genera *Cri'num*, as in the stately *amab'ile*; (xxxix. 1605.) *Pancra'tium*, as in *P. fra'grans*, a lovely species commonly cultivated for bouquets; *Eu'rycles*, (lxii. 3399.) *Zephyran'thes*, one of which is popularly called the "Atamasco-lily," (vii. 239.) and latest acquired, but first in majesty, *Eu'charis*. The last-named is interesting to many from having been used largely in the Princess Alexandra's bridal posy. On the summit of a tall green leafless stem stand two or three flowers, and as many more buds, the former so balanced as to meet us face to face, and composed of two white equilateral triangles 3—4 inches across from point to point, and in the centre a white cup, as in the narcissus, but instead of enclosing the stamens, bearing them like little flags along its margin, and veined with green. The cup is formed of the immensely dilated bases of the filaments of the stamens, the edges of which perfectly conjoin, and make the upper part of the cup seem castellated. Not many white liliaceous flowers retain their beauty so long after being cut, yet eventually even the Eucharis dissolves almost to water, the petals gradually becoming transparent film. What this glorious plant is capable of becoming was shown at Syon in the autumn of 1863. The leaves of the individual referred to measured 2½ feet in length by 6½ inches in width; of flower-stems, varying from 2½ to 3 feet in height, there were no less than 22, and as every stem bore a fair umbel of blossoms, the total number of separate flowers would be at least 150. *Narcis'sus*, the most extensive of the amaryllidaceous genera, is immediately recognised by its central cup, usually of a colour different from that of the sepals and petals, and by having the stamens concealed within. In addition to the species named above, there are commonly grown the polyanthus-narcissus and the jonquil. The former is marked by its large umbel (Fig. 188.); the latter is wholly yellow, rather small, and has leaves resembling rushes. Both make delightful parlour plants; the polyanthus-narcissus in water, like hyacinths; the jonquil in pots of earth. Out-of-doors may be seen a multitude of others, single and double, usually with powerful scent, and ringing all possible changes on white and yellow and in proportion of parts. *Narcis'sus Bulboco'dium* (iii. 88.) bears the appropriate name of the "hoop-petticoat." Of twiners there are many examples in the beautiful genus *Alstræme'ria*, which are often also distinguishable by their irregular and exquisitely variegated flowers, as in *Alstræme'ria Lig'tu*, *peregri'na*, and *pal'lida* (iv. 125; iv. 139; lviii. 3040.) *Alstræme'ria au'rea* (lxi. 3350.) an erect species, with orange-yellow flowers, is hardy and very common in the open border. *Coburgh'ia coccin'ea* (lxvii. 3865.) has umbels of narrow scarlet bells an inch and a half long; *Spreke'lia Cybis'ter* (lxvii. 3872.) umbels of singular and pendulous greenish flowers, reddish at the base, and with extremely long stamens; *Cyrtan'-thus* is another very elegant umbellate genus, as in the green and orange *obli'quus* (xxviii. 1133.) *Hæman'thus* is usually known by its vast crowd of rather small red flowers surrounded but not overtopped by a great spathe. *Imatophyl'lum Aito'ni* or *Cli'vea nob'ilis*, (lv. 2856.) has a corymb of large, erect, and rich salmon-coloured blossoms. *Isme'ne*, (lxv. 3675.) *Phædranas'sa*, *Colla'nia*, *Boma'rea*, *Elisæ'na*, (lxvii. 3873.) *Pyroli'rion*, *Habran'thus*, (li. 2485.) *Hymenocal'lis*, *Callipsy'che*, *Stenomes'son*, (lxvii. 3803.) *Brunsvi'gia*, (xxxix. 1619.) *Phycel'la*, *Struma'ria*, (xxxiii. 1363.) *Doryan'thes*, (xli. 1685.) *Sternber'gia*, (ix. 290.) *Bravo'a*, are like the above, either admirable in their commanding splendour, or lovely in their simple beauty. Mostly, however, they are plants of rare appearance, except in conservatories specially devoted to collections of bulbs, and bulbous plants being dormant for a large portion of the year, it is not likely that they will ever acquire the popularity which attaches to evergreen and free-flowering under-shrubs, such as fuchsias, geraniums, and Genistas.

The most famous plant of the family has yet to be named. This is the great American aloe, *Aga've America'na*, familiar alike in the greenhouse and in the proverb, which is founded, however, on misapprehension. So far from requiring a hundred years to attain perfection, though many individuals live to a great age, and appear not to flower at all, a period of 25 to 30 years is sufficient for the full development of the plant, and in warm climates it is probably reached earlier. In 1820 an American aloe bloomed at Salcombe, Devonshire, which was certainly known to be only 21 years old; yet the stem rose 27 feet high, and produced, by computation, not less than 16,000 blossoms. This was one of the finest stems of bloom ever produced in England, though since that time there have been many of great altitude and splendour, and now the occurrence of an aloe in flower is by no means rare. It is remarkable of this wonderful plant that although a native of America, it has made itself, like the *Opun'tia*, perfectly at home in southern Europe. At Lisbon and Santarem the hedges are principally composed of it; at Hyères, on the coast of France, it finds means of support on every old wall by the wayside;—even in Jersey it flourishes in so much vigour that it may not improbably at no distant period become half-naturalised. The leaves of the Agave are 4—6 feet long, sword-shaped, rigid, flat or slightly grooved above, convex beneath, very acute, spinous along the margin, sometimes bordered with yellow, and closely imbricated at the base into an immense radical tuft, the points spreading on all sides. The flower-stem rises 12—20—40 feet high, and bears a panicle of innumerable clusters of yellowish-green blossoms, the perianth tubular and 2—3 inches long, the stamens exserted as much further, and the anthers versatile and deep-yellow.

CLXV. THE CROCUS FAMILY.—*Irida'ceæ.*

The inferior ovary of the Amaryllidaceæ is again found in the Crocus-family, but in company with only three stamens, the anthers of which open upon the outer side. These characters keep them distinct from the Liliaceæ; and from the Orchis-family, when the flowers happen to be irregular, which is but seldom, they are distinguished by the stamens being perfectly free from the style. In many cases the Iridaceæ also present a peculiar habit of foliage, the leaves being "equitant," that is to say, placed in two opposite rows, with the edges folded together vertically, and in such a way as for the base of every leaf to clasp the stem and the base of the leaf next above, the two sets of leaves spreading away from the stem in the same plane, and having their sharply compressed backs at right angles with the plane of the ground. All are herbaceous; the roots are usually bulbous, though many have substantial rhizomes; the flowers are generally handsome, often brilliant, and for the most part regular and more or less of a star-like figure when fully expanded. Ordinarily this is only in bright sunshine, no flowers being more sensitive to light (though some are indifferent), and showing their susceptibility by opening and closing with the slightest change in the state of the sky. Some creep out of their coverings soon after sunrise, and wither away by noon; others fade if they be carried in the hand but half-an-hour. In many genera the flower-buds are enclosed in a membranous sheath. The fruit is universally capsular, and the seeds are always numerous.

Of ascertained species of Iridaceæ the number is about 500, the greater portion natives of the Cape of Good Hope, and a good many others growing in the middle parts of Europe and North America. How many are truly British is rather difficult to say, no less than six or seven out of the nine or ten that have been accounted so, having a mark of doubt placed against their names by different authors. For practical purposes, they may be assumed to be eight, exclusive of the *Cro'cus sati'vus*, (E. B. v. 343.) no longer found, and of the *Cro'cus præ'cox*, the *Cro'cus au'reus*, (Supp. i. 2645, 2646.) and the *Cro'cus reticula'tus*, which grow, or grew formerly, upon the site of an old garden in a park at Barton, Suffolk, manifestly not indigenous. At Gelly Evan, near Swansea, the Spanish *I'ris xiphioi'des* has grown for at least half a century, in company with *I'ris fœtidis'sima.*

A.

Leaves all radical, narrow-linear, and grass-like; arising (generally rather behind-time compared with the flowers) from bulbs or corms that are covered with loose brown skins; when full grown, 6—8 inches long. Flowers regular and nearly radical, the six segments equal in size.

- * Tube of the perianth 2—4 inches long, commencing a very short distance above the bulb. Segments elliptical, blueish-purple or sometimes white, and spreading only in sunshine. Ovary deep in the ground. Style thread-like, 2—4 inches long. Stigma much dilated, usually cut and fringed, and of a bright orange-colour.
  - Flowers appearing in spring, in company with the young but dilatory leaves. 1. SPRING CROCUS.
  - Flowers appearing in autumn, after the leaves of the current year have withered, those pertaining to themselves not appearing till the subsequent spring. Stigma fringed and tassel-form. 2. AUTUMNAL CROCUS.
- ** Tube of the perianth very short. Stigma short and deeply cleft. Flower about three-fourths of an inch long, pale purplish-blue, yellow in the centre. 3. TRICHONEMA.

B.

Flowers blue, rather small, growing about four together upon nearly simple and nearly leafless scapes, which are two-edged, and rise 9—12 inches high, mingled with grass-like foliage that is often taller. Perianth 6-cleft, the segments nearly equal. Style short. Stigmas three, filiform, and rolled inwards. 8. SISYRINCHIUM.

C.

Plant with a distinct and leafy stem, which rises 1—3 feet high. Flowers large and conspicuous.

- * Perianth irregular, red or pink, the flowers disposed in a unilateral spike of 4—6—8. Three upper segments and three lower ones forming each a distinct set, after the manner of the lip-shaped corollas of certain Exogens. Leaves linear-lanceolate, flat, equitant, and none of them rising higher than the summit of the flower-stem. 4. COMMON SWORD-LILY.
- ** Perianth regular, the three sepals larger than the three erect petals, and curved outwards and downwards, so as to become half-pendulous. Stigmas three, petaloid, resembling an inner corolla, and arching outwards over the three stamens, which are concealed from direct view. Flowers 2-3-4 together, near the summit of the stem.
  - † Leaves sword-shaped and equitant.
    - Sepals broadly-ovate, 2—3 inches long, bright-yellow, pencilled with purple. Petals narrow and very small. Stem 2—3 feet high. Lower leaves 1—2 inches across where widest, and often rising higher than the large and handsome flowers. Capsules green, 2—3 inches long. Seeds pale-brown. 5. COMMON YELLOW IRIS.

(Plant with a distinct and leafy stem. Perianth regular. Stigmas petaloid. Leaves sword-shaped and equitant.)

Petals two-thirds as long as the sepals. Flowers dull violet-blue, often livid, and pencilled with darker lines; occasionally yellowish, and then not pencilled. Stem 18—24 inches high. Leaves narrow, one or two of them overtopping the flowers. Seeds scarlet or bright-orange colour, and widely exposed by the recurving of the capsule-valves. Whole plant yielding a powerful odour when bruised.
6. Fœtid Purple Iris.

†† Leaves four-cornered. Flowers grayish-blue. 7. Snake's-head Iris.

HABITATS AND DISTRIBUTION.

1. Spring Crocus—*Cro'cus ver'nus.*

Meadows, especially near rivers; local and rare, but where found, usually plentiful. Near Nottingham, in profusion, covering more than 100 acres, and flooding the ground with lilac. Mendham, Suffolk. Totteridge, Herts. Fl. March April.

E. B. v. 344.

2. Autumnal Crocus—*Cro'cus nudiflo'rus.*

Meadows and pastures; local and rare. Near Nottingham. Prestwich, Didsbury, &c., near Manchester, plentiful. Fl. Sept. Oct.

E. B. vii. 491; Baxter, ii. 137.

The flowers of the autumn crocus are usually surrounded by grass, so that the circumstance of their being unaccompanied by leaves, is apt to be overlooked. Their appearance, moreover, at the same season as those of the leafless Colchicum, often causes them to be mistaken for the latter. But in the crocus there are only *three* stamens, whereas the colchicum possesses *six*, though abnormal specimens of the crocus may occasionally be found with eight segments to the perianth and the reproductive parts in fours, and more rarely, even with pentamerous and pentandrous flowers. The leaves come up in winter, and are in perfection in March and April, when those of the spring crocus, then in bloom, are barely developed. "*Cro'cus specio'sus*" (E. B. Supp. ii. 2752) appears to differ only in the length of the stigma, which in the *nudiflo'rus* does not exceed the stamens, but here extends beyond them.

3. Trichonema—*Trichone'ma Colum'næ.*

Dry heaths and sandy places. In Britain occurring only upon the warren between Dawlish and Exmouth, Devonshire, where it is plentiful. Found also in Jersey and Guernsey. Fl. April, May.

E. B. xxxvi. 2549 (as *Ix'ia Bulboco'dium);* Baxter, iii. 202 (as *Trichone'ma Bulboco'dium*).

Trichone'ma is a genus intermediate between Crocus and Ixia. Our native species is in Italy a common plant, and one of those that, by association, add so much pleasure to the tour of an English botanist. The little green hillocks round the celebrated fountain of Egeria, near Rome, are studded in early spring with its pretty flowers, which vary there to yellow and white. Round about the fountain itself grow many another of our loveliest wild-plants, as the maiden-hair fern and the ivy-leaved bell-flower; the one recalling the sea-washed cliffs of Ilfracombe; the other the first trickles of the Severn upon Plinlimmon. The *Ix'ia Bulboco'dium* of Bot. Mag. viii. 265, sometimes confounded with the *Colum'næ*, is to all appearance a different plant.

4. Common Sword-lily—*Gladi'olus commu'nis.*

Among bracken in the New Forest, between Lyndhurst and Bolderwood, and between Lyndhurst and Christchurch. Fl. May, June.

Bot. Mag. iii. 86.

The New Forest plant has been described under the names both of *Gladi'olus imbrica'tus* and *Gladi'olus Illyr'icus*. That these names apply only to inconsiderable varieties of the *commu'nis* is shown by Mr. Syme in Seeman's "Journal of Botany," vol. i. p. 130.

5. Common Yellow Iris—*I'ris Pseud-Ac'orus.*

Ponds, marshes, river-sides, and in sedge-bordered lakes and meres; common everywhere. Fl. May—July.

Curtis, i. 149; E. B. ix. 578; Baxter, ii. 82.

The tall, upright, sword-like leaves, and great golden *fleur-de-lis*, elegantly pencilled with deep purple, render this plant strikingly ornamental. It will grow in a dry garden, and is not infrequent even in towns, though then much lacking in its native splendour for want of water. Every stem produces a total of 5 or 6 blossoms, but it is rare for more than one or two to be open at once. Their appearance is the flowery signal of approaching summer, and may be taken as a capital test of an early or a late season. In the south of England, so many days earlier than June 1st that they expand, is the season forward; and so many that they are later than that date, is the season behind. The colour varies occasionally to brownish and to primrose.

6. Fœtid Purple Iris—*I'ris fœtidis'sima.*

Woods, groves, shady hedgebanks, and on grassy slopes, principally near the sea. In the south and west of England, common; the same in Ireland, but scarcely wild in Scotland. South Devon and Isle of Wight, extremely abundant. The yellow variety about Swanage, Hampshire. Fl. May—July.

E. B. ix. 596.

Though the flowers are not brilliant, their immense quantity renders them conspicuous in early summer; and in autumn and early winter nothing is more remarkable than the glowing appearance of the orange or scarlet seeds, which long remain attached to the spreading valves of the capsule, and present a fine contrast to the evergreen leaves. Unfortunately the peculiar animal nidor of the plant is so powerful as to be offensive to almost everyone who gathers.

7. Snake's-head Iris—*I'ris tubero'sa.*

A very old garden-flower, originally from the Levant, now thoroughly naturalised about Penzance, and near Cork. Fl. March, April.

E. B. Supp. iii. 2808; Bot. Mag. xv. 531.

resemble an inner corolla, as described abov
and petaloid sepals, which give the flowers
Wales' feather. The very common and old-f
German'ica, (Bot. Mag. xviii. 670.) the origina
the kings of France. That of which the dried
I'ris Florenti'na, (xviii. 671.) a rather stiff but
flowers. After these in frequency come *variega'*
ochroleu'ca, (xxxvii. 1515.) *xiph'ium*, (xviii.
fragrant little Persian Iris, (i. 1.) and many m
considerable number occur in the same colle
gated, whence the name of "Iris;" many are
have a coloured beard down the centre of th
adds greatly to the richness of the appearance

Crocuses, the cheerful spring ornaments of e
varieties, are reducible to very few genuine speci
cloth-of-gold, or *Cro'cus Susia'nus*, (xviii. 652
have a broad brown and feathered stripe dow
common yellow is the *Cro'cus lu'teus*, (ii. 45.) a
ciated with it in earthen porcupines and simi
ver'nus. Besides these, there are *biflo'rus*, (x
lagenæflo'rus, (lxvii. 3869.) of which the E. B
many more, running through all shades an
yellow, and being apt to produce plenty of
structure this little plant is one of the most
The circular and flattened cormus is clothed
from its surface arise numerous buds, which
carefully dissecting these spires the perfectly f
flowers may be taken out entire; while the pl
raised above the summit of the corm, and t

The third of these beautiful and familiar groups has of late years acquired an amount of popularity that renders it a rival of the dahlia. Blooming in autumn, tall, handsome, richly-coloured in great variety, and admirably adapted for planting in masses, the Gladiolus bids fair to become a permanent necessity of every garden, the more so since the culture is very simple. No flower is more easily recognised. The leaves are sword-shaped and equitant; the stem rises 3—5 feet high, and for 12—24 inches of its upper part, has a double line of blossoms, pointing slightly right and left, yet not so much so as to prevent the spike being unilateral. These blossoms are 6-cleft, rather irregular, yet vase-like, two inches across where widest, the lower lobes the smallest, and the upper ones pointed; the pistil, with its large and handsome triple white stigma, stands, usually, higher up than the three long narrow lilac anthers, which in position are like the prongs of Neptune's trident;—the ovary and the lower portion of the perianth are embedded in large and leafy bracts. Innumerable varieties and hybrids are now possessed, derived chiefly from the *Gladi'olus Byzanti'nus*, and from the *cardina'lis*, (iv. 135.) *floribun'dus*, (xvii. 610.) *psittaci'nus* or *Natalen'sis*, (lvii. 3032.) and others brought from the Cape of Good Hope during the last century. The brilliant scarlet and delicate blush tints of some of the seedlings are only to be compared with those of Gloxinias. Like tulips, hyacinths, geraniums, and other pets of the florist, the latter are fast acquiring a thousand princely names.

Greenhouse and half-hardy species of Iridaceæ are like those of Amaryllids, both numerous, and deservedly great favourites. The gorgeous tiger-flowers, or *Tigrid'ias*, blazing in scarlet and orange, are distinguished by their monadelphous stamens. *Witse'nia corymbo'sa* (xxiii. 895.) has panicles of flat branches that bear cymes of lovely blue. The same colour prevails in the umbelled flowers of the *Gelasi'nes*, as in *G. azu'rea* (lxvi. 3779.) *Bobar'tia auranti'aca* has beautiful pale-orange flowers, an inch and a half across. *Anomathe'ca cruen'ta*, popularly called "flowering-grass," is rich orange red, spotted with crimson. *Trito'nia*, *Sparax'is*, *Watso'nia*, *Mari'ca*, *Ix'ia*, *Hydrotæ'nia*, *Paterso'nia*, *Moræ'a*, *Babia'na*, *Streptanthe'ra*, *Herber'tia*, *Cypel'la*, *Galax'ia*, *Geissorhi'za*, *Antholy'za*, *Phalocal'lis*, present, in their various species, the most exquisite hues, and such as fit them more than any other flowers, for the chaplet and to inherit the name of the daughter of Thaumas.

———— Induitur velamina mille colorum
Iris ————————————

A large number of the species are figured in the early volumes of the Bot. Mag. from which their general aspect may in some degree be learned.

CLXVI. THE ORCHIS FAMILY.—*Orchida'ceæ.*

The Orchis-family is without question the most remarkable in nature. The anomalous structure of the flowers, their amazing variety, and the manner of life proper to the greater portion of the species, are circumstances that, standing alone, would give interest to a race of plants;—here we have them in combination, and manifested in the highest degree. The few kinds which occur in Britain grow, like other plants, in the earth, but the tropical forms mostly perch themselves upon the boughs and in the clefts of trees, procuring their nourishment partly from the atmosphere, partly from the decaying organic matter that casually accumulates about their roots. To denote this mode of existence, and to distinguish them from "parasites," the tree-inhabiting orchids (along with other tropical plants of similar tendencies) are called "epiphytes." No plants unfold blossoms of more rare and transporting beauty, or of figures more fantastic, or of odours more ambrosial, or of colours more rich and vivid. They rarely remind us of other plants, seeming to take pleasure in the widest possible divergence from all accustomed types of structure, especially in the flowers, which in many cases resemble insects, birds, and reptiles, and even quadrupeds and the human figure, whence, among others, we find different species called after the bee and the wasp, the lizard, the dove, and the butterfly. Several of these vegetable mimics reside in our own country, England, giving us in this respect, as in every other, a miniature adumbration of the contents of the whole world. In number there are of Orchids probably not less than 6,000 species, resolvable into at least 400 genera. They are distributed almost all over the globe, growing in all latitudes except the very coldest and the very driest, but having their maximum in the tropics. In temperate countries (where they are exclusively terrestrial) they ornament groves, meadows, and marshes with flowers like little hyacinths; in the hot damp woods of the equatorial regions they are chiefly aërial, decorating the trees with the highest splendours of natural jewellery. No plants

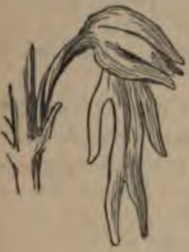

Fig. 189.
Flower of Green Man Orchis (enlarged).

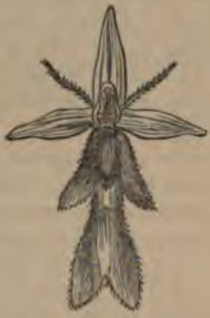

Fig. 190.
Flower of Fly Orchis (enlarged).

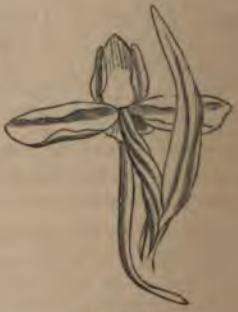

Fig. 191.
Flower of *Or'chis conop'sea* (showing nectary and twisted ovary).

better recompense the florist than do the epiphytic species, nor do any impart so magic a beauty to our hothouses. Requiring, however, special treatment, they do not mix well, ordinarily, with other flowers, so that the "orchid-house" is usually a distinct one. The hardy species, for similar reasons, are seldom seen except in their native haunts. *Cypripe'dium Calce'olus*, the queen of the European orchids, and the most esteemed for the outdoor flower-border, is almost the only one which cultivators have succeeded with; the frequent failure to preserve the others probably comes of their being transplanted when too far advanced in life, since the duration of a terrestrial orchid rarely exceeds four or five years. Pot-culture appears to suit them best, and as it has been proved that they can be raised from seed, it may be after all only a question of care and skill. Uses, for so large a tribe, the orchids can scarcely be said to possess, except that in supplying keys to profounder knowledge of the structure and philosophy of plants in general than could possibly be obtained were they absent, they do, in fact, subserve the highest and grandest of all uses. Any plant that contributes to the advancement of phytological science is in that respect inestimably useful. *Economic* orchideous products are the delicious spice called vanilla; salep, prepared from the farinaceous tubers of certain European species; and, in South America, vegetable glue.

The distinguishing peculiarity of the structure of these wonderful plants is the blending of the filaments of the stamens with the styles and stigmas. The nature of this blending is, however, in itself quite peculiar, and to understand it we must first look to some other points. Being Endogens, the type or plan of the flowers of Orchids is *ternary*. This is generally plain enough in the three sepals, but leaving these, we seem to lose it almost immediately, and in fact it is only by observation of the exquisite internal structure pointed out by Mr. Darwin, that the ternary structure of the remainder of the flower becomes evident. This keen observer shows us that an orchid-flower consists of fifteen elementary parts, many of them in a much modified and confluent condition, and that every one of these fifteen is indicated by a group of vessels (microscopic of course) which runs into it from the general axis. Three of these fifteen groups of vessels flow into the three sepals, one to each; two flow into the lateral petals, one entering each; three flow into that gay portion of the flower which hangs or projects in front, and which is technically called the lip or "labellum;" and seven, completing the number, enter the great fleshy mass that stands in the centre, and which is technically termed the "column." The lip and the column

flower, the stigma that stands highest
called the "rostellum." In all the gene
alone is developed in a perfect state, th
as rudiments or vestiges of various ki
anther are often widely divergent, and
seems diandrous. It is further charac
pollen usually coheres in waxy masses,
into minute stalks, and acquire a club-

The roots, foliage, and inflorescence
—all, however, are herbaceous and suc
of the plant is seen in some of the terr
stem exists at first only as a growing p
constituting, while in its infancy, a sim
little bud grows upwards into a stem,
and a terminal raceme of flowers. Ever
loped a lateral bud at the base, with
extremity, so that, after flowering, the
of the current year's stem and root, an
and vigorous one in process of growth,
of the following season. The epiphyti
green pseudo-bulbs, from the summits
variable in size, but usually elliptical, a
and, in due season, one or more long,
So unpretentious are these latter that,
open, they would be thought incapa

lateral petals correspond with them more or less nearly, or differ from them more or less widely; the lip (formed of the third petal, with two petaloid stamens adjoined) is usually of quite a different form, and often of some singular configuration. It is in the lip that the speciality of the flower is mostly found; if there be anything grotesque, or any extra painting, the lip is the usual place for it, though sometimes the quaintness is given by the column, or by the sepals, or by a tail, or by extreme attenuation of the lateral petals, or by general pantomime of the whole flower. There are species of *Cirrhopet'alum* in which the elongated petals and sepals give the head of flowers the appearance of Medusa's dishevelled hair. The "tail" is really a nectary, produced backwards from the base of the lip, and in certain exotic species of *Angræ'cum* and *Habena'ria*, attaining a length of 12—18 inches. The ovary alone remains to be described. This organ is always "inferior," and frequently twisted. When ripe it bursts by longitudinal clefts, and discharges innumerable seeds that resemble the finest possible sawdust. How vast a quantity may be judged from Mr. Darwin's calculation of the possible fecundity of a single plant of the common *Or'chis macula'ta*, which he reckons to be thirty capsules, and 186,300 seeds! Magnified, the seeds are found to have a loose and delicately-reticulated testa, resembling a little net purse, while the round embryo seems a gold-coin in the centre. The profile of the purse appears in different species either oval, or wavy and curved; the embryo also varies in size, and the meshes of the net-work would seem to be marked in ways sufficiently different to afford useful supplementary distinctions. In germination, the little purse is elevated upon the cotyledon, just as we may observe the testa lifted in growing onion-seed.

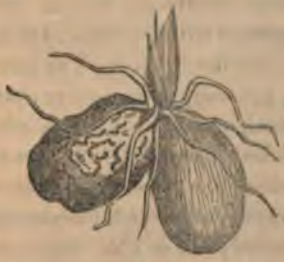

Fig. 192.
Tubers of Orchis.

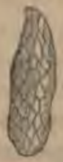

Fig. 193.
Seed of Orchis
(greatly magnified).

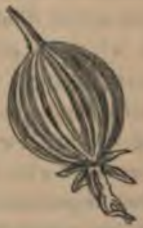

Fig. 194.
Capsule of *Liste'ra*
(enlarged).

The facts connected with the life-history of Orchids, as recently set forth by the same author, are, if possible, still more extraordinary than is

special adaptedness on the part of an ins
Thirty-six orchidaceous plants are i
them with bold varieties that, viewed as
some botanists, to 45. The stems rise on
and terminate in simple spikes or racem
roots are either wholly fibrous, or supple
tubers, which are either ovoid or palmat
are parallel-veined, undivided and entir
succulent, amplexicaulent, principally ra
shining, and in a few cases spotted with b
often provided with the nectary above s
a marked degree the long and pendulous
tion chiefly resides. In colour they are
white or green, and often beautifully m
the green ones, all appear capable of the
few that do not exhale odour, especiall
however, are very capricious in this res
son of their appearance, though a few b
lady's-tresses to advancing autumn. T
and pastures, in marshes, upon hills, an
of the sea, often not particular as to soil,
turbed, excepting the insectiform spec
to chalk and limestone. For the micro
parts, very beautiful objects.

B.

Flowers many together in a unilateral spike or raceme. No nectary.

1. Flowers white or greenish, small and fragrant.
   - A. Rootstock fibrous, branched and creeping, the shoots terminating in tufts of leaves, which are ovate, and about an inch in length. Flowers 10—15.
     16. Creeping Goodyera.
   - B. Roots with ovoid tubers. Flowers in spirally-twisted spikes.
     - * Leaves all radical, ovate or oblong; the stem 4—6 inches high, and clothed with short scales. Flowers numerous, close together, forming an elegant, erect, and simple spiral.
       13. Common Lady's-tresses.
     - ** Leaves in part upon the lower portion of the stem, but all narrow.
       Spike 2—3 inches long; flowers forming a simple spiral.
       14. Large-flowered Lady's-tresses.
       Spike 1—1½ inch long; flowers in three parallel spirals.
       15. Irish Lady's-tresses.
2. Flowers dingy greenish-purple, rather large, usually numerous, and forming a long, lax, erect, and unilateral raceme. Stem 1—2 feet high, well-clothed with broadly-ovate and amplexicaulent leaves; the upper ones lanceolate, and all ribbed and plaited. Lower bracts much longer than the half-pendulous flowers. Lip shorter than the sepals and petals. Ovary obovoid.
   4. Broad-leaved Epipactis.

C.

Flowers usually numerous, forming terminal and erect spikes or racemes, and disposed upon all sides of the stalk. No green leaves, or only a very few short scales.

1. Perianth with a thick nectary below the large and ovate lip, the latter turned upwards. Flowers 3—4, pale yellowish, rather large. Stem 6 inches high.
   12. Epipogium.
2. No nectary. Entire plant, including the flowers, brown or yellowish-white.
   - Lip cleft, longer than the sepals, and the lobes spreading. Stem about 12 inches high, leafless, and provided only with brownish sheathing scales. Roots formed of innumerable fibres, matted together like a bird's nest. Flowers brown. 11. Bird's-nest Orchis.
   - Lip undivided, and shorter than the sepals. Stem 6 inches high, the lower portion scaly. Root copiously branched, the branches horizontal, spreading about 2 inches, yellowish, the lobes broad, blunt, distinct, and not touching one another. Flowers 5—10, yellowish.
     3. Spurless Coral-root.

D.

Flowers usually numerous, forming terminal and erect spikes or racemes, and disposed upon all sides of the stalk. Plant with green leaves, though sometimes only two.

1. Middle lobe of the lip long and remarkably twisted. Stem 2—3 feet high. Flowers 20—60, forming a rather lax spike, dull in colour, and strongly scented. Calyx converging. Tubers large and globular. 24. Lizard Orchis.

Stem 6—15 inche
Anther-cells divergent
Flowers broad, pu
Stem 12—18 inche

B. Flowers in a dense and pyram
(unless very exceptionally p
olate. Lip trifid, the lobes
Nectary only a little lon
convexities above t
becoming obtuse.
Nectary twice as long as
long and slender lol

2. Nectary present, but shorter than the c
A. Flowers yellowish-green, greenisl
tinge; never of any shade of re
verging. Stem 6—8 inches higl
inches long.
Middle lobe of the lip the lar
fragrant, small, cream-c

Middle lobe of the lip the
leaves nearly ovate. Tul
the flowers.

B. Flowers red or crimson, the shad
spots and freckles, especially upo
* All three sepals convergin
ing a helmet-like arch.
spots. Flowers scentles
Nectary nearly as

(Spike or raceme neither spiral nor unilateral. Plant with green leaves.)

Nectary very short and obtuse. Stem 3—4 inches high. Flowers small and crowded, the summit of the spike looking as if singed or burned, through the purple-brown colour of the buds. Lip not above a quarter of an inch long. 19. Brown-topped Orchis.

** Upper sepal converging; two lateral sepals spreading, or reflexed upwards. Flowers scentless. Spike 1—6 inches long. Stem 6—18 inches high. Leaves more or less spotted and blotched with blackish-purple.

Spike loose and open. Tubers ovoid and undivided. Flowers deep crimson, rather far apart, and very showy. Leaves chiefly radical, and of a fine sleek and shining green. No green veins in the sepals.
20. Early Purple Orchis.

Spike dense, conical while young. Tubers palmate. Flowers numerous, densely crowded, usually pale lilac or whitish, and variously streaked and mottled with purple, especially upon the lip; never wholly red or crimson.
22. Common Mottled Orchis.

⁂ All three sepals spreading.

† Spike dense, 1—6 inches long, and conical, or, at least, while young. Tubers two, palmate. Flowers scentless. Stem 12—18 inches high.

Bracts scarcely as long as the ovary, and shorter than the flowers, which are usually pale, and variously lined and mottled with lilac or purple, but never simply red. Leaves always copiously spotted with dark-purple. Stem solid or nearly so. Pollen green. Tubers distinctly palmate.
22. Common Mottled Orchis.

Bracts longer than the crimson flowers, making the spike look leafy. Leaves erect, usually without spots, or only slightly spotted. Stem hollow. Tubers irregularly and imperfectly palmate.
23. Purple Marsh Orchis.

†† Spike long and loose. Tubers ovoid and undivided. Flowers bright-purple. 21. Loose-flowered Orchis.

4. Nectary entirely wanting, or existing as the simplest protuberance.

A. Lip much longer than the sepals, pendulous, and usually flat. Flowers scentless.

* Leaves only two, so close as to be apparently opposite, sessile, and placed upon the stem at some distance above the ground: flowers yellowish-green; capsule globular; roots fibrous.

Leaves oval, 2–5 inches long, 3–6 inches above the ground, and spreading horizontally. Stem 12—18 inches high. Racemes 3—9 inches long. Flowers often 30—40, distant, the lip long, deeply cleft, and the lobes parallel. 9. Common Twayblade.

centre; the pet
that of a fly. Flo
apart.

Flowers numerous, gr
variegated. Lip
long, and hangin
portion long and
converging. Tul

B. Lip scarcely longer than the sepals,
variegated, and scentless.

Sepals usually pink. Lip broa
spotted, and velvet-like, th
down, the lateral ones ver
that of a pink flower with

Sepals usually green. Lip dul
scarcely or only very slight

C. Lip not longer than the sepals, and

*** Flowers rather large, in a loose**
scentless. Stem leafy, 12—15

† Flowers white or cream

Leaves broad. Brac
lower ones longe

Leaves narrow. Bra
lower ones rarely
7.

(Flowers pedicellate and erect.)

Sepals narrow-linear, fully one-fifth of an inch long. Stem triangular, with two leaves at the base. 2. LIPARIS.

†† Flowers sessile, numerous, and powerfully scented. Leaves only 2—3. Tubers nearly globular, the new one produced at the extremity of a root-fibre. 32. MUSK ORCHIS.

HABITATS AND DISTRIBUTION.

1. MALAXIS—*Malax'is paludo'sa.*

Spongy moors and peat-bogs; diffused over nearly the whole of Britain, but not abundant, and rather difficult of detection. Whittlesea Fens, Northamptonshire. Spongy sides of hills near Dunoon, in company with *Pinguic'ula Lusitan'ica.* Clova, abundant. Fl. end of Aug.

Curtis, iv. 638; E. B. i. 72; Baxter, v. 394.

2. LIPARIS—*Lipa'ris Lœse'lii.*

Bogs and moors in Cambridgeshire, Norfolk, and Suffolk, growing close to the stems of rushes, &c.; very rare. Fl. July.

E. B. i. 47 (as *O'phrys Lœse'lii*); Baxter, vi. 414.

3. SPURLESS CORAL-ROOT—*Corallorhi'za inna'ta.*

Moist woods in a few places in Scotland. Culross. Fl. June, July.

Curtis, iii. 544; E. B. xxii. 1547; Baxter, vi. 422.

4. BROAD-LEAVED EPIPACTIS—*Epipac'tis latifo'lia.*

Woods and shady hedgebanks; not uncommon, but, for the most part, very sparingly in any one place, a circumstance the more remarkable from the freedom with which it ripens seeds. Combermere woods, abundant. Near Manchester, plentiful. Fl. July, August.

Curtis, iii. 540; E. B. iv. 269 (as *Sera'pias latifo'lia.*)

From this are distinguished by some botanists, *Epipac'tis purpura'ta* (E. B. Supp. ii. 2775.) and *Epipac'tis ova'lis* (Supp. iv. 2884.) The former, according to Mr. Babington, is only a variety of a third species, called *Epipac'tis me'dia.* For the reputed characters, see that author's "Manual." It may be added that a good practical distinction for the *purpura'ta* variety, is its tendency to throw up ten or a dozen flowering-stems from the same root, whereas in the normal *latifo'lia* there is usually only one. The former is plentiful in Kent.

5. MARSH EPIPACTIS—*Epipac'tis palus'tris.*

Low wet places, marshes where there is not much water, and in sandy and calcareous spots that are liable to be overflowed, and afterwards left comparatively dry. Spread all over Britain, but rather rare, especially in Scotland. In profusion among the sandhills at Southport, coast of Lancashire, growing on the borders of the little temporary lakes. Fl. July, August.

Curtis, iii. 541; E. B. iv. 270 (as *Sera'pias palus'tris*); Baxter, iv. 317.

8. Red Cephalanthera—

Woods and groves; extremely rare.
E. B. vii. 437 (as *Sera*

9. Common Twayblade

Shady woods, groves, and moist gras
most parts. Sometimes in open and ma
glare of the sun. Fl. May, June.
Curtis, i. 205; E. B. xxii. 1548 (

A singular and very pretty orchid, readily d
leaves upon the otherwise naked stem, genera
and by the long and slender raceme of green
parallel lobes. When transferred to a garde
masses are industriously collected and carried
ing up fruit. By the end of July, the capsu
abundance. They are spherical, the size of a
meridians, three broad ones and three narro
maining upon the summit. The raceme is th

10. Small Twayblade—

Hilly pastures and heaths, generall
plains. In the north of England, North
land, not uncommon. Found also in Ir
Curtis, iii. 539; E. B. v. 358 (

In Merionethshire this little plant is rather
and boggy hillsides, and usually under the
Malax'is and the *Lipa'ris*, it seems half-epiph
the same manner, with its roots amid decayi

Resembles an overblown *Oroban'che*, having the appearance of a withered rather than of a living plant, and persistent in this condition for a year or two after flowering. From the similarity of its habit to that of the *Lathræ'a* and the *Monot'ropa*, it has been considered parasitical, but their appears to be no ground for this belief.

12. EPIPOGIUM—*Epipo'gium aphyl'lum.*

"Beneath oak-trees, on a steep bank, close to the Safey brook, Tedstone Delamere, near Bromyard, Herefordshire, 1854." Fl. July.

Bot. Mag. lxxx. 4821.

13. COMMON LADY'S-TRESSES—*Spiran'thes autumna'lis.*

Dry hill-sides, among short turf, and loving the neighbourhood of the sea. Common in England, but not extending into Scotland, though found in Ireland. Near Bristol, on the limestone, in many places. Also in the moist sand edging inland marshes, as at Barmouth, where it abounds. Fl. September.

Curtis, ii. 279; E. B. viii. 541 (both as *O'phrys spira'lis*); Baxter, i. 63.

14. LARGE-FLOWERED LADY'S-TRESSES—*Spiran'thes æstiva'lis.*

Bogs; extremely rare, and hitherto noticed, as regards Britain, only in the New Forest, near Lyndhurst, and in Wyre Forest, Worcestershire. Channel Islands. Fl. summer.

E. B. Supp. iii. 2817.

15. IRISH LADY'S-TRESSES—*Spiran'thes gemmip'ara.*

"In a boggy meadow at Berehaven, near Castletown, county Cork, Ireland." Said to be now extinct, through the effect of drainage, and the cultivation of the surface. Fl. August, September.

E. B. Supp. ii. 2786; Bot. Mag. lxxxvii. 5277 (as *Spiran'thes cer'nua.*)

16. CREEPING GOODYERA—*Goodye'ra re'pens.*

Moist and mossy woods in the Highlands of Scotland, especially old ones. Fir-woods in Aberdeenshire, and Cawdor woods, Nairnshire, abundant. Fl. August.

Curtis, iii. 537; E. B. v. 289 (as *Saty'rium re'pens*); Baxter, iv. 309.

17. COMMON HELMET ORCHIS—*Or'chis Mo'rio.*

Meadows on the banks of rivers; rather rare, though plentiful where found, and occurring chiefly in the south of England. In Cheshire, towards Manchester, very abundant. Found also in Ireland, but in Scotland not hitherto noticed. Fl. May, June.

Curtis, i. 294; E. B. xxix. 2050.

18. GREAT HELMET ORCHIS—*Or'chis milita'ris.*

Meadows and pastures on the slopes of hills, and along the margins of woods, chiefly upon chalk and limestone. In England confined, or nearly so, to the valley of the Thames, from Berkshire eastwards. In Scotland and in Ireland not known. Fl. May, June.

[illegible]

Dry open meadows and pastures, ch
in England, but in Scotland and Irel
some parts of Kent very abundant. F
Curtis, iii. 529; E

20. Early Purple Orch

Meadows and pastures, especially nea
and shady places. Common, and in son
April, May, in company with the cowsl
with it, forming a fine contrast of colo
Curtis, i. 135; E. B

A strikingly beautiful plant, at once distingu
absence of green veins from the sepals and pet
state of this plant, with the perianth-segmen

21. Loose-flowered Orch

Moist meadows and boggy places in J
Fl. April—June.
E. B. Supp. iii

22. Common Mottled Orc

Wet meadows, among long grass, n
and in boggy and swampy places; ab
monest of the British orchids. Fl. Ma
Curtis, iii. 528; E.

23. Purple Marsh Orch

Moist meadows, and in low wet pl
common. Fl. May, June.

24. Lizard Orchis—*Or'chis hirci'na.*

Dry and bushy places on chalky soil. In Kent and Surrey it was once abundant, but has now become extremely rare. Near Canterbury, 1860, more than 2 feet high, and with nearly 50 blossoms. Fl. June, July.

Curtis, iii. 532; E. B. i. 24 (ss *Saty'rium hirci'num.*)

25. Pyramidal Rose Orchis—*Or'chis pyramida'lis.*

Dry and grassy banks, sunny downs, meadows, and among bushes on earthy and weedy cliffs, often almost within reach of the spray of the sea, and preferring chalk and limestone. Not infrequent in England and southern Scotland, and found also in Ireland. Fl. June—August.

Curtis, iii. 531; E. B. ii. 110.

26. Fragrant Mountain Orchis—*Or'chis conop'sea.*

Meadows, pastures, and heaths, both dry and moist, sometimes even in marshes. Common, especially in Scotland and Ireland, and often at great elevations. Ben Lawers, very abundant. Fl. June, July.

E. B. i. 10; Curtis, iv. 637; Baxter, vi. 409 (both as *Gymnade'nia conop'sea.*)

One of the most fragrant of our native orchids, the odour resembling that of the carnation, but said to be evolved only when the plant grows in moist land.

27. Small Butterfly-orchis—*Habena'ria bifo'lia.*

Moist meadows and pastures, groves, and shady way-sides; common. Fl. May, June.

E. B. Supp. iii. 2806.

28. Great Butterfly-orchis—*Habena'ria chloran'tha.*

Moist meadows and pastures, borders of woods, groves, shady places and retired green lanes; common. Fl. May, June; in perfection when the grass is ready for the scythe.

Curtis, ii. 429; E. B. i. 22 (both as *Or'chis bifo'lia.*)

In the evening deliciously fragrant, the odour resembling that of honeysuckle.

Concerning this species and the preceding there is wide difference of opinion. The *chloran'tha* is a much taller plant than the other, generally rising to the height of 18—20 inches, and bearing a raceme that, in luxuriant individuals, growing beneath the shade of trees, is often 6—8 inches long. The habit is more robust, the leaves are broader, and the cells of the anther are nearly twice as far apart at the base as they are at the top. This gives the flowers greater width, and renders them much more handsome. In colour moreover they are nearly pure-white, whereas in the Small Butterfly-orchis, which is less in all its parts, and has the anther-lobes approximate at the base as well as at the apex, they are of a decidedly greenish tint. These characters, Mr. Bentham says, are not constant, the two forms being connected by every intermediate. Mr. Darwin, on the other hand, holds them absolutely distinct, remarking that "they differ from each other more than do any two of most of the species of the genus Orchis."

29. GREEN MOUNTAIN ORCHIS—*Habena'ria vir'idis.*

Moist meadows and pastures, chiefly in hilly districts. Common in the north of England, in Scotland, and in Ireland. In the south rather rare. Fl. June, July.

Curtis, iii. 533; E. B. ii. 94 (as *Saty'rium vir'ide.*)

30. WHITE MOUNTAIN ORCHIS—*Habena'ria al'bida.*

Grassy mountainous pastures; chiefly in the north. Abundant in Yorkshire and in the Highlands of Scotland. Found also in North Wales and in Ireland. Fl. June.

Curtis, iii. 534; E. B. viii. 505 (as *Saty'rium al'bidum); ;* Baxter, v. 387 (as *Peristy'lus al'bidus.)*

31. GREEN-MAN ORCHIS—*A'ceras anthropoph'ora.*

Dry meadows and pastures, chalk-quarries, and sometimes in woods, but confined to the eastern and south-eastern counties. Gate Burton wood, near Gainsborough, plentiful. Fl. May, June.

Curtis, ii. 430; E. B. i. 29 (both as *O'phrys anthropoph'ora*) ; Baxter iv. 305.

The green flowers present the figure of a little man "swinging as if some great ogre held him by the hair of his head."

32. MUSK ORCHIS—*Hermin'ium Monor'chis.*

Dry pastures upon chalk, almost confined to the southern and eastern counties of England, and not found in either Scotland or Ireland. Wooded slopes towards Elham, near Canterbury, fine and abundant. Fl. June—August.

Curtis, iii. 535; E. B. i. 71 (as *O'phrys Monor'chis); ;* Baxter, iv. 295.

33. BEE ORCHIS—*O'phrys apif'era.*

Dry pastures, downs, grassy commons, and upon chalky and limestone cliffs, among bushes. Chiefly in the southern counties, where it is often abundant. Found also in Ireland, but not in Scotland. Wiltshire Downs, and Burnham, Somersetshire, plentiful. Fl. May, June.

Curtis, i. 66; E. B. ix. 383; Baxter, i. 8.

Luxuriant individuals sometimes attain the height of 2 feet, and occasionally, though rarely, the flowers may be found pure white. Others are sometimes found with the sepals white, and the lip yellowish. *O'phrys arachni'tes* (E. B. Supp. i. 2596; Bot. Mag. li. 2516.) differs in no characters of importance, and possibly may be a hybrid between the *apif'era* and the *aranif'era.*

34. FLY ORCHIS—*O'phrys muscif'era.*

Dry pastures, and sunny open spaces in dry woods, chiefly upon chalk and limestone. Scattered all over England, and abundant in many parts of the south and south-east. Silverdale, North Lancashire, plentiful. In Scotland not found, and barely so in Ireland. Fl. May, June.

Curtis, iii. 536; E. B. i. 64.

The flowers are sold in the Manchester market-place tied in the centre of bunches of lilies-of-the-valley.

35. SPIDER ORCHIS—*O'phrys aranif'era.*

Dry pastures and open downs, among short grass; very rare, and almost confined to the south-east of England. Shakspere's Cliff, Dover, and thereabouts. Fl. April—June.

E. B. i. 65.

O'phrys fucif'era (Curtis, ii. 431; E. B. Supp. i. 2649.) is a slight variety of this species.

36. LADY'S-SLIPPER ORCHIS—*Cypripe'dium Calce'olus.*

Formerly wild in the woods near Rievaulx Abbey, and in other parts of Yorkshire, but now, it is to be feared, extinct. Fl. May, June.

Curtis, iii. 545; E. B. i. 1; Baxter, ii. 105.

Differs from all other orchids (not of its own genus) far more than any two of the family, that are not Cypripediums, do from each other. The three inner stamens are developed, though confluent; the central anther, found in all other orchids, is not present, but instead of it, there are found the two lateral anthers which elsewhere are never seen perfect; and lastly, the pollen-grains are not united into waxy masses.

The history of orchid-culture in England, when fairly written out, will be a record both of the progress of taste in our country for high-class flowers, and of the willingness of our florists and amateur cultivators to lavish upon them almost incredible sums of money. The prices daily paid even for ordinary species bring to mind the Tulipomania of the seventeenth century, and new and rare ones are only obtainable by the wealthiest. In the catalogue of the Cambridge Botanic Garden for 1815, occur the names of only a score or two;—now, entire conservatories are devoted to these lovely plants; first-class flower-shows in May and June owe at least half their brilliancy to the same; and deficient indeed is the drawing-room vase or bouquet of any pretension, that does not contain a Dendrobium, an Oncidium, or a Calanthe. Ordinarily, the greater portion are kept in an atmosphere at once warm and very moist, except while the plants are at rest, and such conditions are no doubt necessary to a large number. Others, however, natives of sub-tropical latitudes, or of temperate regions on tropical mountains, do quite as well under "cool treatment;" and from recent satisfactory trials there is good reason to expect that not a few will before long become occupants even of the parlour flower-table, mingling their exquisite bloom with that of the fuchsia and the geranium. Being so numerous, it is of course impossible to specify in the present place more than a few of those most usually met with, and two or three others that are eminently remarkable. The oldest and commonest is perhaps the *Phai'us grandifo'lius*, formerly called *Ble'tia Tankervil'liæ*, which in early spring throws up numerous tall racemes of rather large flowers that are externally white, and internally yellowish-brown. *Dendro'bium nob'ile*, like the *Phai'us*, throws up abundant racemes, more copiously hung with flowers, and recapitulated off and on nearly all the year, every blossom two inches across, white, flushed with lilac, and with a contracted lip of the richest violet-purple. *Dendro'bium densiflo'rum*, instead of erect racemes, has full, rich, half-pendulous ones, in enormous abundance, and of a deep orange-yellow. *Oncid'ium flexuo'sum*,

laburnum. The same is the case wit
"air-plant," and which may generally
little flowers. *Van'da te'res* has sten
flowers coloured lilac and buff. *Catt'le*
blossoms of two or more shades of de
intensely, and daintily fringed. *Pha*
Veronica, moulded in wax. *Periste'ri*
and nearly globular flowers, an inch o
centre the image of a dove. *Cycno'ches*
lates that which is expressed in the nan
inches in length. *Angræ'cum sesquiped*
formed of snow-white wax, and a slim
down to the length of 15 inches. The
inverted, present the exact similitude of
ears. *Oncid'ium Papil'io*, the true "butt
very end of a wire-like stalk that arches
and mottled blossom, so like an insect wi
well deem it a "flying flower." *Gongo'r*
lous panicles that seem composed whol
partly dark-red. *Læ'lia*, *Stanhope'a*,
Barke'ria, *Sophroni'tis*, *Renanthe'ra*, *Od*
la'ria, *Lycas'te*, *Di'sa*, *Sobra'lia*, and ot
especially *Dendro'bium*, supply, each in
the most eccentric, or colours lovely bey
leaves the mind nothing to desire. It is
wide variety of tint, *blue* is nearly unk
proach perhaps is in the newly-introdu
appears not to be known.

Besides the orchids esteemed for thei

CLXVII. THE RUSH FAMILY.—*Junca'ceæ.*

Rushes and their northern allies are herbaceous plants, often much resembling grasses, but with pretty star-like flowers that indicate a near relationship to the Liliaceæ. Stems generally rigid, occasionally pliant, straw-like, unbranched, and, in the true rushes, (constituting the genus *Junc'us)* provided with distinct pith, a circumstance anomalous among Endogens. In many species of the same genus they terminate in points as sharp as needles. Leaves either cylindrical, very long and slender, and hollow, or nearly so;—or flat, linear, and tapering, like those of grasses. Sometimes the leaves are undeveloped, existing only in the rudimentary form of dark-brown or blackish scales which sheathe the base of the stem. Inflorescence variable, but most frequently an irregular panicle or umbel, which is either terminal or lateral, and in the latter case is situated about half-way up the stem. Here and there the flowers are clustered into heads, or axillary and solitary or nearly so. Calyx and corolla forming a regular six-parted perianth, which is dry, and of a deep-brown or greenish colour. Stamens six, rarely only three; ovary solitary, superior, and free; style solitary; stigmas usually three; fruit a triangular capsule, usually three-celled, few or many-seeded, and surrounded by the permanent perianth. The pith-cells, in certain species of *Junc'us*, as *commu'nis* and *glau'cus*, present, when examined with the microscope, a beautiful system of network. (Fig. 195.) In other species, as *acutiflo'rus*, *squarro'sus*, and *bufo'nius*, the cells are simply oval, as in Fig. 196.

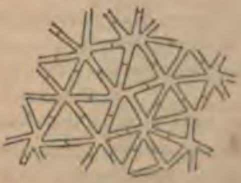

Fig. 195.

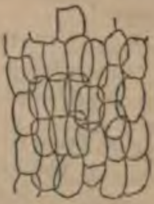

Fig. 196.

Pith-cells of Rushes (highly magnified).

Of nearly 200 species that are known, the greater portion inhabit the colder parts of the world, and some of them the very coldest. They are in many cases of considerable utility, as happens with the common rushes of our own country, which in certain kinds, are valuable not only to the candle-maker, but to the owner of bog and swamp land, the soil of which they help to fix and prepare for the purposes of agriculture.

Many plants popularly called rushes belong, however, to other families, as the bull-rush, the club-rush, and the flowering-rush.

Twenty-two grow wild in Britain, several of them with varieties that are often counted as species, and the addition of which makes a total, with some botanists, of over thirty. Some, on the other hand, reckon the total as only 20. Three formerly included in Floras, are now omitted,—*Junc'us arc'ticus,* (Curtis, iv. 403.) *Junc'us casta'neus,* (E. B. xiii. 900.) and *Junc'us gra'cilis* (E. B. xxxi. 2174.)

A.

Leaves (if present) cylindrical at their extremities, and generally cylindrical throughout their whole length, destitute of white hairs, and usually stiff. Capsules with numerous minute seeds.

1. Flower-stems perfectly leafless, but with rudimentary sheathing leaf-scales at the base. Barren stems resembling leaves.

* Stems 1—2—3 feet high. Panicles lateral, about half-way up the stem.

† Stems soft, pliable, pale green, faintly striated, and all usually bearing flowers. Stamens three or six. Panicle either diffuse, or dense and conglomerate. Pith continuous.
2. Common Soft Rush.

†† Stems stiff, tough, and rigid, many of them without flowers.

Perianth segments very narrow. Stem deeply striated. Panicle ascending. Stamens six. Pith interrupted. Fruit black. Plant glaucous.
1. Common Hard Rush.

Perianth-segments nearly ovate. Stem very faintly striated. Pith continuous. Rhizome spreading widely.
4. Baltic Rush.

** Stems seldom more than 12 inches high, and usually less.

Panicle terminal and cymose. Leaves about half the length of the stem, exceedingly rigid, grooved, and spreading in a rosette-like manner. Whole plant very stiff and hard.
5. Common Heath Rush.

Panicle simple, about 7-flowered, and usually not above half-way up the stem, which is soft, pliable, and extremely slender. Flowers large. No true leaves. Rhizome creeping.
3. Thread-like Rush.

2. Flowering-stems with a few leaves or leaf-like bracts upon them.

* Leaves hollow, with internal cross partitions. Panicle terminal.

Perianth-segments more or less pointed. Stem and leaves flattened, the latter usually 3—4—6. Stature extremely variable, ranging from an inch to 3 feet.
6. Common Joint-rush.

Perianth-segments all obtuse. Stem and leaves rounded, the former ordinarily 2—3 feet high, with an interlacing panicle, and usually only two leaves.
7. Blunt-flowered Joint-rush.

(Flowering-stems with a few leaves or leaf-like bracts upon them.)

** Leaves cylindrical, without internal cross-partitions, very stiff, and ending in prickly points.

a. Seaside plants.

Perianth and capsule about equal in length. Stem 1—2 feet high. Panicle long and lax. 11. COMMON SEASIDE RUSH.

Capsule twice as long as the perianth. Stem 2—3 feet high, with a very sharp and rigid point. Panicle dense and corymbose. 12. GREAT SEASIDE RUSH.

b. Moorland plant. Perianth-segments equalling the capsule, about one-fifth of an inch long, and with broad and membranous margins. Leaves numerous and somewhat recurved. Stem 4—12 inches high, sturdy and rigid. 5. COMMON HEATH RUSH.

⁂ Leaves neither cross-partitioned internally; nor cylindrical, stiff, and needle-pointed.

† Annuals. Flowers very pale.

Flowers distinct, and forming dichotomous and leafy panicles. Stems numerous and tufted, 3—6 inches high. Whole plant very pale and weak. 9. COMMON TOADS' RUSH.

Flowers collected in one or two large terminal heads of 3—10. Stamens usually three. Leaves filiform and radical, excepting one at the base of the heads. Plant 1—4 inches high. 10. JERSEY RUSH.

†† Perennials. Flowers brown. Leaves mostly radical.

a. Flowers in loose, terminal, cymose panicles, the perianth-segments glossy, scarcely one-tenth of an inch long, and usually shorter than the capsule. Stem slender, 12—18 inches high. 8. MUD RUSH.

b. Flowers in terminal heads. No barren stems. Capsules light brown.

Head solitary, with 1—4 flowers. Stem 2—4—6 inches high. 15. FEW-FLOWERED RUSH.

Heads 1—2—3, with 6—8 flowers in each. Stem 8—12 inches high. 14. CHESNUT RUSH.

c. Flowers very few, sessile, and usually solitary in the axils of one or two of the upper leaves or bracts, which are 2—3 inches long. Stems crowded, very slender, 3—6 inches high. 13. HIGHLAND RUSH.

B.

Leaves soft, flat, linear, and grass-like, usually fringed with long white hairs, especially at the base. Capsules with three large seeds.

1. Flowers in loose panicles.

* Peduncles one-flowered, reflexed when in fruit. Stems weak, slender, 6—12 inches high. Leaves narrow and weak. Panicle 1—2 inches in diameter.

Capsules obtuse. Crest of the seeds sickle-shaped. 18. SMALL WOOD-RUSH.

Capsules acute. Crest of the seeds straight and blunt. Plant in flower when the former has young fruit. 19. FORSTER'S WOOD-RUSH.

2. Flowers in compact ovoid or globul
Heads 3—6, the central one sessil
length, but averaging an inch.
or but few together. Filament
of the unopened buds much p
black.
Heads almost always consolidate
in the preceding. Stems 9—
tufted. Flowers light brown.
so. Seeds oblong.
Heads almost sessile, and collecte
inch in length, and more or le

HABITATS AND

1. COMMON HARD R

Everywhere in low, waste, wet
soil is damp and poor. Fl. July,

E. B.

Many of the stems are destitute of
leaves, for which they are liable to be
scales at the base. "*Junc'us diffu'sus*
applied sometimes to small individuals o
effu'sus.

2. COMMON SOFT RUS

Ditches, pondsides, and marsh

3. Thread-like Rush—*Junc'us filifor'mis.*

Stony margins of lakes in the north of England and in Scotland. Derwentwater. Fl. summer.

E. B. xvii. 1175.

4. Baltic Rush—*Junc'us Bal'ticus.*

Wet and sandy sea-coasts; rare, and in Britain found only in the northern counties of Scotland. Plentiful on the sands of Barrie, near Dundee, forming large plots in the meadows and hollows among the sandhills. Fl. July.

E. B. Supp. i. 2621.

5. Common Heath Rush—*Junc'us squarro'sus.*

Barren sandy moors and heathy ground; common, though in some districts, as near Bristol, unknown. On the moors in South Lancashire, sometimes forming a large portion of the herbage. Fl. July.

E. B. xiii. 933.

The flowers are larger than those of the swamp rushes, and are prettily variegated with glossy brown and yellowish-white.

6. Common Joint-rush—*Junc'us acutiflo'rus.*

Edges of ponds, ditches (especially where muddy), swamps, wet moors, sandy sea-shores, and even in dry ground; common everywhere. Fl. summer.

E. B. iv. 238 (as *Junc'us articula'tus*).

One of the most variable of our native plants, but always readily told by the characters above-mentioned. The peculiar knotted feel of the leaves when passed between the finger and thumb, would distinguish it, except from the following species, even to a blind man. When cut or torn lengthways, they are found to be hollow, with transverse white partitions, the crushing of which into lumps, causes it to appear as if they were internally jointed. The most beautiful of the varieties is the plant commonly called the shining-fruited rush, or *Junc'us lamprocar'pus*, (E. B. xxx. 2143; Baxter, v. 399.) which has capsules of a fine polished black or purplish-brown, those of the common form being pale and greenish. It is rather smaller in stature, and the panicle is less compound, but the capsules are the largest of any. Of this form there is a remarkable maritime sub-variety, with trailing stems that root at the joints, and which in some places, as in the Isle of Islay, covers the shores in profusion. "*Junc'us pelocar'pus,*" found in the salt-water marshes near Middlesborough, north-eastern Yorkshire, has capsules still larger than those of the common *lamprocar'pus*, but paler and fewer, as are also the bracts. Another pretty variety is the little bog-rush, *Junc'us supi'nus* or *uligino'sus*, (E. B. xii. 801.) which is only a few inches high, with panicles very slightly branched, and in autumn often viviparous. In the latter state it is sometimes found floating upon the surface of shallow water, and covering it with a tangled mass of leaf and stem. *Junc'us nigritel'lus* (E. B. Supp. i. 2643.) is another little variety, 6—12 inches high, with rather more flowers than is usual in *lamprocar'pus*, and the capsule more abruptly pointed, but otherwise resembling it.

7. BLUNT-FLOWERED JOINT-RUSH—*Junc'us obtusiflo'rus.*

Wet places, like the preceding, but much less frequent. Fl. July, August, later than the *acutiflo'rus.*

E. B. xxx. 2144.

Easily distinguished by its cylindrical leaves, and pale and entangled panicle, the last divisions of which are much deflected.

8. MUD RUSH—*Junc'us compres'sus.*

Wet and swampy places, especially near the sea, and in salt-marshes; rather uncommon, and seldom found inland. Fl. summer.

E. B. xiii. 934 (as *Junc'us bulbo'sus.)*

Junc'us Gerar'di or *cœno'sus* (E. B. Supp. i. 2680.) differs from this only in some very minute particulars, and is said to be the salt-marsh form of the plant.

9. COMMON TOADS' RUSH—*Junc'us bufo'nius.*

Moist, low, swampy, and barren ground, especially such as lies under water during winter; in country lanes, upon the ridges between the horses' path and the wheel-ruts, and in sandy hollows that have been scooped out by floods. Common everywhere. Fl. July, August.

E. B. xii. 802.

10. JERSEY RUSH—*Junc'us capita'tus.*

Sandy ground in Jersey and Guernsey. Fl. June, July. Annual.

E. B. Supp. i. 2644.

11. COMMON SEASIDE RUSH—*Junc'us marit'imus.*

Sandy and muddy sea-shores, salt-marshes, and in wet pastures on the coast; not uncommon, except in Scotland, where it is rare. On Braunton Burrows, a district of sandhills near Barnstaple, this species and the next are the predominant plants. Fl. July—September.

E. B. xxiv. 1725.

The white bases of the stems are clammy, and exhale the odour of red cedar-wood.

12. GREAT SEASIDE RUSH—*Junc'us acu'tus.*

Sandy sea-coasts; chiefly in the south-west of England, South Wales, and Ireland. Braunton Burrows, near Barnstaple, plentiful, and many of the tufts taller than a man. In Scotland not found. Fl. June, July.

E. B. xxiii. 1614.

Readily distinguished from the *marit'imus*, with which it often grows, by the close panicles of large and shining brown capsules. These probably do not ripen till the second season. The herbage also is of a deeper green. The barren stems and the leaves are as stiff and sharp as the quills of a porcupine, and inflict severe punctures if we be not careful.

13. HIGHLAND RUSH—*Junc'us trif'idus.*

Damp and rocky mountain-tops in the Highlands of Scotland. Clova, very fine. Fl. summer.

E. B. xxi. 1482.

14. CHESNUT RUSH—*Junc'us casta'neus.*

Bogs upon micaceous mountains, at a great elevation. In Britain only in the Highlands of Scotland, local and rare. Fl. summer.

E. B. xiii. 900.

15. FEW-FLOWERED RUSH—*Junc'us triglu'mis.*

Boggy places upon mountains in the Highlands of Scotland, the north of England, and North Wales; not uncommon. Ben Lomond, near the summit, very plentiful. Fl. summer.

E. B. xiii. 899.

Two forms of this plant have been registered and figured as species—*Junc'us triglu'mis* and *Junc'us biglu'mis* (E. B. xiii. 898.) The former, which is the commoner one in Britain, usually has three or more flowers and a longer and more tapering capsule. The *biglu'mis*, on the other hand, usually has only two flowers; the capsule is short and obtuse, and the tip of the outer bract is leafy. This one is found chiefly on Ben Lawers.

16. COMMON MEADOW-RUSH—*Lu'zula campes'tris.*

Dry meadows and pastures, and in sandy and heathy places among short turf: everywhere. Fl. April, May.

Curtis, i. 91; E. B. x. 672 (both as *Junc'us campes'tris*); Baxter, v. 379.

One of the earliest flowers of spring, and conspicuously distinguished from the grasses with which it associates by the deep brown or almost black hue of its flower-buds. The blossoms, when open, are of a beautiful star-like figure, and have large yellow anthers, beyond which the triple stigma projects for a considerable and unusual distance. Even before they expand, the stigma is often protruded, in a manner perhaps without parallel.

17. ROUND-HEADED HEATH LUZULA—*Lu'zula conges'ta.*

Moors and heathy places, turfy bogs, pond-sides, and woods, but rarely or never among hay-grass; common. Fl. June, a month or six weeks later than the preceding.

E. B. Supp. ii. 2718.

Many botanists regard this plant as a variety of the *L. campes'tris.* I am disposed to consider it distinct, though not without misgivings as to the certainty of the characters. It is considerably taller, of a peculiar gray and hoary aspect, generally much tufted, blossoms several weeks later, and has flowers of a delicate light brown, instead of blackish. The seeds, moreover, are oblong, instead of globose, and both the habit and the habitats are different.

18. SMALL WOOD-RUSH—*Lu'zula pilo'sa.*

Everywhere in woods and cloughs, one of the earliest flowers of spring, but unpretending, and liable to be overlooked. Fl. March—May.

Curtis, ii. 317; E. B. xi. 736 (both as *Junc'us pilo'sus.*)

common, especially in the north
the south-west of Yorkshire it i
by the rustics, and has received
blades." Fl. April—June.

Curtis, ii. 318; E. B. xi. 7

A handsome plant, remarkable, like
scattered tufts of white hairs, which a
joints in a very curious manner, looki

21. HIGHLAND LU

Highlands of Scotland, abund
of the Breadalbane range. Occa
in North Wales. In Ireland not

E. B. xvii. 1176 (

22. DROOPING MOUNTAI

Summits of mountains in the H
gorum, Loch-na-gar, Ben-y-Bour

Curtis, iv. 604;

In the southern hemisphere grow Ju
some even aloe-like and arborescent.
English gardens, where the family is
Luzulas, as *ni'vea* and *al'bida*, both wit
land. *Xero'tes ri'gida*, from New Holla
Calecta'sia cya'nea, (Bot. Mag. lxvii. 3
"everlasting," with a slightly branched
of needle-shaped and acutely-pointed

either sheathing at the base, or accompanied by sheathing stipules. Flowers inconspicuous, greenish or purplish-brown, or in certain exotic species, white; usually in spikes an inch or two long and elevated slightly and vertically above the surface of the water; occasionally axillary and solitary, and in some cases unisexual. Perianth in four small segments or sometimes absent; stamens, in the European species, usually four, sometimes only two or one; ovaries and stigmas of about the same number; the former superior.

Though almost always the merest weeds in general character and aspect, these plants, both in their flowers and foliage, are very curious when minutely examined, and the economy is in many cases remarkable. Idle streams and disused canals are not infrequently stopped up by the abundant growth of some of the more slender kinds; in clear water, on the other hand, and where the current is fresh, certain species often present quite as beautiful an appearance as the larger kinds of Algæ do in the sea. The evaporation, from the whole surface, when they are lifted out of the water, is extremely rapid, rendering it difficult to get specimens home unwithered, or at least without taking special precautions to preserve them moist. Fifty or sixty species are known, and as with other aquatic families, few parts of the world are without their presence.

Fourteen grow wild in Britain, or according to some estimates, more than twenty.

A.

Flowers enclosed in sheaths, every sheath lying within the base of a long, narrow, and leaf-like bract; the true leaves long, linear, and grass-like, and the stem creeping in the sand and mud of the sea-shore, where ordinarily under water. Peduncle thin, narrow, and leaf-like, bearing a number of sessile anthers in two rows, and about half as many ovaries with linear and deeply bifid styles.

Leaves 1—3—6 feet long, from ¼ to ½ of an inch in width, and with many parallel fibres. Flowering-sheath 1—2 inches long. Ripe seeds oblong, and furrowed lengthways. 12. COMMON GRASS-WRACK.

Leaves 3—12 inches long, narrow in proportion, and with only 1—2—3 parallel fibres. Flowering-sheath about half-an-inch long. Seeds short and without furrows. 13. SMALL GRASS-WRACK.

B.

Flowers extremely minute, axillary, and sessile. Leaves linear. Stems slender, branched, and floating. Plant usually in fresh, but occasionally in salt or brackish water.

Ovary simple and solitary, with usually three stigmas. Anthers sessile and on separate plants. Leaves usually in whorls of three, sometimes opposite, and often clustered in the axils. 14. NAIAS.

Ovaries usually four together, each with a short style and a broad stigma, and either accompanied by a solitary stamen, or the flowers are monœcious, the males and females adjacent upon opposite sides. Stamens with long filaments. Leaves finely linear, bright-green, 1—2 inches long. Ripe carpels sessile, curved and flattened, and tipped with the relics of the styles. 15. ZANNICHELLIA.

C.

Flowers upon axillary peduncles.

A. Peduncles (at first very short) bearing only 2—3—4 flowers, which are destitute of perianth, consisting only of four nearly sessile anthers, and four nearly sessile ovaries. Leaves alternate, linear, and 3—4 inches long. Ovaries, when ripe, ovoid or pear-shaped, pointed, about one-tenth of an inch long, elevated on pedicels, and the general peduncle greatly lengthened, and often spiral. 11. RUPPIA.

B. Peduncles usually with many flowers in erect spikes; sometimes with only 2—4, which are then disposed in a capitate manner; the perianth 4-lobed. Stamens four, the anthers sessile. Ovaries of four carpels, each with a separate stigma, and permanently sessile.

* *Leaves all opposite*, ovate, pointed, 2—4 inches long, somewhat recurved, and very much crowded. Flowers in heads of four, elevated just above the surface of the water. Stem forked. 7. OPPOSITE-LEAVED PONDWEED.

** *Leaves alternate*, unless occasionally opposite at the forks of the stem or below the peduncles.

† Upper leaves with long petioles, floating upon the surface of the water, 2—3—6 inches long, and usually much larger than the submerged ones, which are also different in form. Spikes cylindrical, 2—4 inches long, dense and many-flowered.

a. Lower submerged leaves either petiolate or consisting of petioles only; the floating ones oval, thick, and opaque, with petioles longer than the blade. 1. COMMON PONDWEED.

b. Lower submerged leaves sessile or nearly so.—Peduncles enlarged upwards.

Lower submerged leaves narrow and very numerous; their primary veins 3—5. Peduncles often much crowded towards the ends of the branches. 2. BROWN PONDWEED.

Lower submerged leaves lanceolate; their primary veins 5—7 or more. Floating leaves elliptic-lanceolate, suddenly contracted towards the point, and all with the primary veins connected by elegant network. 3. SHINING PONDWEED.

(Leaves alternate.)

†† All the leaves submerged, sessile, and of the same outline.

1. Leaves broadly-ovate and amplexicaulent, 1½—2 inches long, 7-veined, green and pellucid. Spikes short. Flowers few and brown. 5. PERFOLIATE PONDWEED.
2. Leaves ovate-lanceolate or oblong, broad at the base, half-amplexicaulent, obtuse, and somewhat concave. 4. LARGE PONDWEED.
3. Leaves strongly waved, crisped and serrated along the edges, broadly-lanceolate, or narrow-oblong, tapering at the base, 3—5 inches in length, obtuse, pellucid, and 1—3-veined, the upper ones often opposite.—Spikes small. Flowers 3—6. 6. CURLY PONDWEED.
4. Leaves flat.
    - *a.* Leaves broadly-linear, 2—5 inches long, the primary veins 5, 7, or more. Spike dense and cylindrical. 3. SHINING PONDWEED.
    - *b.* Leaves narrow-linear; primary veins 1—3. Stems thread-like. Spikes few. Flowers 2—3 together.
        - Leaves dilated at the base into sheaths, and thickly disposed upon the stem in ranks that make it seem pectinated on each side. 9. PECTINATE PONDWEED.
        - Leaves not so dilated, and opposite under the peduncles. 8. SLENDER PONDWEED.

HABITATS AND DISTRIBUTION.

1. COMMON PONDWEED—*Potamoge'ton na'tans.*

Pools, ponds, and stagnant waters, everywhere; covering them during summer with broad flat leaves, among which, in July, there are innumerable spikes of flowers.

E. B. xxvi. 1822; Baxter, v. 350.

The leaves, like those of the nasturtium, resist wet, and though floating on the water, are always quite dry, at least upon the upper surface. *Potamoge'ton plantagin'eus* (E. B. Supp. iii. 2848.) is a form with all the leaves submerged, thin, and transparent, smaller flower-spikes and smaller fruit, and no leafless petioles. *P. oblon'gus* or *polygonifo'lius*, (Supp. iii. 2849.) is another small variety, with the floating leaves leathery, no leafless petioles, and the fruit minute and reddish.

2. BROWN PONDWEED—*Potamoge'ton heterophyl'lus.*

In stagnant and running waters, like the preceding; widely diffused, but not very common. Fl. July, August.

E. B. xviii. 1285.

3 SHINING PONDWEED—*Potamoge'ton lu'cens.*

Ponds and slow rivers, usually where the water is deep. Not infrequent, though scarcely a common plant. Plentiful in Cheshire, in the foss at York, and in the lower part of the Derwent.

E. B. vi. 376.

The "Red Pondweed" or *Potamoge'ton rufes'cens*, figured in Curtis, iv. 589, and E. B. xviii. 1286, (both as *Potamoge'ton flu'itans*) is probably not distinct, there being little to distinguish it from the ordinary *lu'cens* beyond the floating upper leaves, and their brownish hue. *Potamoge'ton lanceola'tus* (E. B. xxviii. 1985.) is a small variety, usually with floating upper leaves, and the peduncles not distended upwards.

4. LARGE PONDWEED—*Potamoge'ton prælon'gus.*

Ponds, pools, and slow rivers; widely diffused, but not common. In the river Sow, at Stafford, (a very sluggish and dirty stream) abundantly. Fl. June.

E. B. Supp. iii. 2858.

Potamoge'ton longifo'lius, E. B. Supp. iii. 2847, appears to be the same.

5. PERFOLIATE PONDWEED—*Potamoge'ton perfolia'tus.*

Ponds, lakes, meres, and slow rivers; common. Fl. July, August.

E. B. iii. 168.

6. CURLY PONDWEED—*Potamoge'ton cris'pus.*

Ponds, canals, and slow-moving waters; common. Fl. June, July.

Curtis, ii. 307; E. B. xv. 1012 (the leaves too much lobed).

Very beautiful and curious in its foliage, though inferior to the *P. lu'cens.*

7. OPPOSITE-LEAVED PONDWEED—*Potamoge'ton den'sus.*

Ditches, slow streams, and pools; common, though in some districts, as near Manchester, not met with. Fl. June, July.

E. B. vi. 397.

8. SLENDER PONDWEED—*Potamoge'ton pusil'lus.*

Ponds and streams; not uncommon. Fl. July.

E. B. iii. 215.

Potamoge'ton compres'sus, (E. B. vi. 418.) differs from this only in its broader leaves. Another modification of the same type, called *Potamoge'ton gramin'eus* (E. B. xxxii. 2253.) is distinguished by its stouter habit, darker hue, and shorter peduncles, which scarcely exceed the stipule of the leaf from the axil of which they spring. *Potamoge'ton trichoi'des*, found at Framlingham and other places in Norfolk, differs only in having the leaves single-veined. *P. acutifo'lius*, (Supp. i. 2609.) a rare Sussex form, and *P. zosteræfo'lius* (Supp. i. 2685,) a common plant in Warwickshire, are distinguished by the numerous and closely contiguous veins of the leaves, the whole breadth of which is occupied by their finely parallel lines. Superiority in size, and peduncles 3—4 inches in length, is all that differentiates the *zosteræfo'lius* from the *acutifo'lius*, if the former, as Mr. Bentham suggests, be anything more than a state of the *heterophyl'lus*, destitute of floating upper leaves.

9. PECTINATE PONDWEED—*Potamoge'ton pectina'tus.*

Slow rivers, lakes, and salt-water ditches; common. Fl. July.

E. B. v. 323.

"*Potamoge'ton flabella'tus*" is a name sometimes given to young states of the *pectina'tus.* The mature conditions offer no real marks of difference.

10. ZANNICHELLIA—*Zannichel'lia palus'tris.*

Ponds and ditches, both inland and close to the sea; common. Fl. all summer. Annual?

E. B. xxv. 1844; Baxter, iii. 164.

Some botanists make two species of this plant, calling the inland form *Z. re'pens*, and the slightly-different variety found in salt-water ditches, *Z. pedicella'ta.*

11. RUPPIA—*Rup'pia marit'ima.*

Salt-water ditches, shallow bogs, and seaside ponds; common. Near Shoreham and Worthing, Sussex, very plentiful. Fl. July—Sept.

Curtis, iii. 455; E. B. ii. 136; Baxter, vi. 451.

12. COMMON GRASS-WRACK—*Zoste'ra mari'na.*

At or near low-water mark, on sandy and muddy coasts. Common, though some parts of the British shores do not possess it. Fl. spring and summer.

Curtis, iii. 546; E. B. vii. 467; Baxter, vi. 456.

Interesting to the microscopist as showing the phenomena of circulation.

13. SMALL GRASS-WRACK—*Zoste'ra na'na.*

Similar in habitat to the preceding, but local and rare. Castlemaine Harbour, abundant. Fl. summer.

E. B. Supp. iv. 2931.

14. NAIAS—*Nai'as flex'ilis.*

Salt-water ponds in Connemara, west of Ireland, the only British locality known at present. Fl. July—September. Annual.

Aquariums commonly contain a very pretty plant of this family called *Aponoge'ton dista'chyum*, (Bot. Mag. xxxii. 1293.) one of several found at the Cape of Good Hope. The leaves are elliptic-oblong, 3—4 inches in length, by an inch in width in the middle, petiolate, and lively green. The inflorescence consists of a long green peduncle, bearing at the extremity one or two white branches that are about half as long as the leaves, and upon which are disposed a number of little white blossoms, each consisting of an ovate white bract, about twelve stamens with dark-purple anthers, and 3—6 white pistils. The bracts are placed alternately upon opposite sides of the branches, but in such a way that all the flowers front forwards. Seeds are produced freely, and young plants spring up in plenty, so that no lover of the aquarium need long want it. Still more interesting is the "Lattice-leaf plant," *Ouviran'dra fenestra'lis*, formerly called *Hydroge'ton fenestra'le*, a native of the standing waters of Madagascar, and now grown in the tanks of most first-class hothouses. The foliage is entirely submerged, and looked at from above, seems to consist of large oval pieces of green net. On taking a leaf out of the water, it is found to be 8—10 inches long, 3—4 inches broad, rounded at the extremity, and petiolate; instead, however, of being like other leaves, a plate of continuous substance from side to side, it is literally a piece of open lattice-work, resembling the frame of a window before the glass is put in, but with meshes innumerable. The fibres are so firm that when dried between papers, the figure, delicacy, and colour of the leaf are all preserved. Flowers, resembling those of the *Aponoge'ton*, appear occasionally, but they can scarcely be called so pretty. Both plants are, by some botanists, referred to a family they call *Juncagina'ceæ*, which in the present volume will be found incorporated with the *Alisma'ceæ*.

CLXIX. THE FROGBIT FAMILY.—*Hydrocharida'ceæ*.

Aquatic plants of great interest, and often of considerable beauty. Habit and foliage very various in the different species. Flowers enclosed, while young, in a sheath or "spathe" formed of 1—3 bracts. Sepals three. Petals three, or sometimes absent. Stamens 3—12 or more, usually numerous, either in separate flowers, or seated, along with the perianth, upon the summit of the ovary, which has 3, 6, or 9 cells;—or is 1-celled, with 3 parietal placentas, and supports 3, 6, or 9 styles. Most of the species are unisexual and diœcious. The fruit ripens under water.

Of this attractive little family there appear to be about 20 species. The greater portion are fresh-water plants of Europe, North America, Egypt, the East Indies, and New Holland; a few others grow in estuaries of the sea.

Two are aboriginal to Britain, and a third, from North America, is widely naturalised.

1. Leaves bayonet-shaped, 6—12 inches long, succulent, acute, with a prominent midrib, and pungent marginal prickles, and growing in dense, erect, aloe-like tufts upon the surface of the water, to which the tufts are elevated from creeping runners that penetrate far into the mud. Flower-stalk from an axil of one of the leaves, 4—6 inches long, flattened, two-edged, and supporting a spathe formed of two equitant bracts about an inch in length, inside of which is a large white flower. Perianth with a long tube and six segments. Stamens 20 or more. Styles white, erect, and apparently forming six couples of two each, owing to their being deeply cleft. The flowers are sometimes imperfectly diœcious; sometimes completely so, and occasionally there are several blossoms within the spathe. WATER-SOLDIER.
2. Stems slender and floating; at intervals bearing tufts of kidney-shaped or circular leaves, which are 1½—2 inches across, purplish underneath, petiolate, smooth and fleshy, and flat upon the surface of the water, with abundance of long and thick white rootlets descending at the same points. Flowers nearly an inch across, white, except the centre, which is yellow, and growing in small umbels from the bosom of the leaves; the males 2—3 together, and with 3—12 stamens; the females, on separate plants, with six styles and cleft stigmas, the peduncles in both sexes surrounded by a membranous and pellucid spathe. FROGBIT.

3. Plant wholly submerged, the stems very slender, much branched, and clothed with small, sessile, and spreading leaves, which are about ¾ of an inch in length, and usually three together. Flowers white, in the axils of the upper leaves, the slender perianth-tube elongated two or three inches, so as to reach the surface of the water, where it terminates in three or six small and spreading segments. Female plants alone are known in this country as yet.

ANACHARIS.

HABITATS AND DISTRIBUTION.

1. WATER-SOLDIER—*Stratio'tes aloi'des.*

Ponds, lakes, and meres; chiefly in the eastern counties of England, though found in most parts of the country, and in Scotland also, either wild or introduced. Near Manchester frequent, completely filling up large ponds, with a border of Comarum round the edge, beyond that a circle of rushes, and then a circle of white Galium. Fl. July, Aug.

E. B. vi. 379; Baxter, vi. 413.

A very remarkable plant, and of rapid growth, completely hiding the water, if allowed to spread undisturbed for a few years. Perfect flowers are said to be produced only between 52° and 53°; beyond the latter, up to 68°, which is the northern limit, female flowers only; while south of 52°, there is a predominance of males. This is in accordance with observations made upon the Cucurbitaceæ, which go to show that a high temperature favours the development of stamens, and a low one that of pistils.

2. FROGBIT—*Hydroch'aris Morsus-ra'næ.*

Ponds, clean ditches, and other motionless waters, which are often completely roofed over with the leaves. Common in many parts, but not very general, and in Scotland only where planted. Fl. July, Aug.

Curtis, i. 209; E. B. xii. 808; Baxter, vi. 441.

A charming little plant, in general figure a pigmy water-lily, and excellently suited for the aquarium. The economy of its propagation resembles that of the *Utricula'ria.* During the period of active summer growth, along with the ordinary runners that diffuse the plant over the surface of the water, there are despatched other smaller ones, which instead of producing tufts of foliage, develop little bulbs at their extremities, much after the same manner as the runners of the *Tu'lipa sylves'tris* do, only that here they are subaqueous instead of terrestrial. In the autumn, the parent plant entirely decays and disappears; the bulbs alone retain vitality, and becoming detached from the ends of the effete runners, sink to the bottom, where they remain till March or April, embedded in the mud. The influence of spring, and their own internal force, then bring them up to the surface again, where they sprout, covering it in a little while with leaves, and in turn originating other bulbs, to follow the same course the season after.

3. ANACHARIS—*Anach'aris Alsinas'trum.*

Ditches, canals, and slow rivers; common, especially in the midland counties. Fl. summer.

vation that plants prevented by any casu
the same time with plenty of nutriment, s
It should not be overlooked that althou
the Anacharis produces good sanitary r
before, having become clear through its
family, it makes a becoming and cheer
parlour, often blooms freely.

To the same family belongs the beauti
a native of Italy, universal in aquarium
narrow, bright grass-green leaves, like t
bottom of the water towards the surface
and tubular, are elevated to the surface
coiled. The male flowers grow on sepa
peduncles near the base, and of course far
to discharge their pollen, they are libera
and the water soon becomes covered with t
of vegetable circulation, as shown in th
spectacles that the microscope affords.

CLXX. THE ALISMA

Aquatic and marsh plants, the foli
a considerable height above the sur
senting a very elegant appearance, th
The delicate and trimerous blossoms
tude to those of some of the liliaceou
are immediately distinguished by th
numerous, with only a slight tenden
Triglo'chin connivent while young.

green; petals of the ordinary texture; both parts in threes, and the stamens usually numerous, though in a few cases only nine or six. About fifty species are known, natives of most of the northern and middle parts of the world.

Nine grow wild in Britain, including *Scheuchzé'ria* and two species of *Triglo'chin*, both of which genera are by some botanists combined with certain exotics into a family they call *Juncagina'ceæ*. The same writers also distinguish *Bu'tomus*, making it the type of a little family called *Butoma'ceæ*. This is done on account of the whole surface of the carpels being covered with seeds.

A.

Petals white or pale lilac. Calyx green. Carpels one-seeded, and becoming achenia. Leaves all radical.

A. *Flowers unisexual.* Emerged leaves on long and erect cellular stalks, the blade 6—12 inches long, truly arrow-shaped, the forward portion and the barbs alike lanceolate and acute, and all three portions of nearly the same size; submerged leaves often linear, consisting only of petioles. Flowers in an erect and interrupted cluster raised 8—12 inches out of the water; the corolla the size of a primrose, and consisting of three snow-white petals, which at the base are either rosy or blotched with violet. Stamens about 24. Ovaries numerous. Female flowers fewer than the males, beneath them, and on shorter peduncles. 2. WATER ARROW-LEAF.

B. *Flowers bisexual.* Stamens six.

* Carpels numerous and distinct.

a. Stems 2—4 feet high, much branched; the branches whorled in successive series, sub-divided, and forming a very large and handsome pyramidal panicle. Flowers numerous, solitary at the extremities of the numerous branchlets, the petals pale lilac, crumpled, and yellow at the base. Carpels 20—30, forming a ring round the axis of the flower. Leaves ovate, acute 5—7-ribbed, 6—12 inches long, erect, and on petioles twice their length. 3. COMMON ALISMA.

b. Flowers few, forming an umbel which is usually simple. Carpels numerous, arranged irregularly in a globular head.

Stems usually erect, sometimes prostrate and creeping. Leaves linear-lanceolate, attenuated at both extremities, 3-ribbed, erect, and on long stalks. Flowers pale lilac, few and large. Carpels with 4—5 prominent ribs. 4. UMBELLED ALISMA.

Stems floating on the surface of the water. Leaves ovate and petiolate, rising in little tufts from the joints, with a few flowers intermingled. Carpels with 12—15 slender ribs. 5. FLOATING ALISMA.

** Carpels never more than six, tapering into long points, and radiating in a star-like manner. Leaves all radical, ovate or oblong, and petiolate. Flower-stems 3—6—9 inches high. Petals white, with a yellow spot at the base. 6. STAR ALISMA.

Carpels adhering by their edges to a ce
from the base upwards, and presen
Stigmas feathery. Anthers sessile.
Ripe fruit linear. Carpels three
Ripe fruit ovoid or oblong. Carp
B. Stem leafy, rush-like, the upper leaves
few. Carpels usually three, rarely fo

HABITATS AND

1. BUTOMUS—*Bu'*

Ponds and slow streams; chiefly
land, and in Ireland. Fl. July, Au

Curtis, i. 29; E. B. x

One of the handsomest plants our coun
erroneous name of "Flowering-*rush*."

2. WATER ARROW-LEAF-

Slow streams and canals; chiefly
in the fens near Doncaster. Foun
scarcely known. Fl. July, August.

E. B. ii. 84; B

A plant of remarkable beauty, and affor
arrow-headed leaf.

3. COMMON ALISMA-

Ditches, muddy pools, and shall
except in the north of Scotland, a
thickets. Fl. August.

Curtis, ii. 319; E. B. xi

5. FLOATING ALISMA—*Alis'ma na'tans.*

Lakes of Cumberland and North Wales, and more particularly in lakes in the west of Ireland. South side of Llyn Padarn, Snowdon. Fl. August, but rather seldom.

E. B. xi. 775.

6. STAR ALISMA—*Actinocar'pus Damaso'nium.*

Little pools and plashes on gravelly commons; rare, and chiefly in the south-eastern counties. Fl. summer.

Curtis, iii. 320; E. B. xxiii. 1615 (both as *Alis'ma Damaso'nium*): Baxter, vi. 437.

7. MARSH ARROW-HEAD—*Triglo'chin palus'tre.*

Wet and boggy meadows, and on the borders of marshes; common. Fl. June—August.

Curtis, iii. 483; E. B. vi. 366; Baxter, i. 60.

8. SEASHORE ARROW-HEAD—*Triglo'chin marit'imum.*

Salt marshes and muddy seashores; common. Fl. May—Sept.

Curtis, iii. 483; E. B. iv. 255.

9. SCHEUCHZERIA—*Scheuchze'ria palus'tris.*

Wet and spongy mountainous bogs; very rare. Lakeby Car, near Boroughbridge, Yorkshire. Bomere, Shropshire. Methven, Perthshire, in the smaller of the two bogs, plentiful (1859.) Fl. June.

E. B. xxvi. 1801; Baxter, vi. 503.

Tanks and aquariums often contain a very beautiful plant of this family called *Limnoch'aris Humboldt'ii.* (Bot. Mag. lx. 3248.) The stems are 12—18 inches long, semi-pellucid, and jointed internally; the leaves roundish-oval, cordate and obtuse, 2—3 inches across, and with long semi-pellucid petioles, the midrib of the lamina remarkably swollen, and with three slender but conspicuous veins on either side. The flowers come up singly on long peduncles, (which, like the stems, are jointed internally) and in shape resemble those of the frogbit, but are 2—3 inches across, and of a delicate primrose-colour, which at the base of the petals becomes deep-yellow. Stamens numerous; pistils six; anthers and stigmas purple. Though a native of Buenos Ayres, where it grows in fresh-water pools, this charming plant does well out-of-doors, and near Manchester may be seen growing on the edges of reservoirs, mingled with the water arrow-leaf, though indebted probably to the warmth from the engine-house for its hold upon life.

Several exotic species of *Sagitta'ria* are also cultivated, the leaves, however, in some, no longer arrow-shaped, but *lanceolate.* Such are the Canadian *rig'ida* and the *lancifo'lia* (xxxix. 1632, xlii. 1792.)

CLXXI. THE SPIDERWORT FAMILY.—*Commelyna'ceæ.*

A few interesting garden flowers of liliaceous aspect are all that ordinarily represent the Commelynaceæ. The most frequent of them is that good old-fashioned plant, the common Spiderwort, or *Tradescan'tia Virgin'ica,* (Bot. Mag. iii. 105.) distinguished by its abundant grass-

microscope; and the flowers as a
they are prone to move into th
double. This is shown in three o
and on one side their perfect frin
they dilate into half-petals. *Tr*
from the above in its smaller fl
peduncles, and calyx. *Tradescan*
greenhouse plant, from South Am
baskets, on account of its long trail
leaves, red underneath, sessile, an
mely'na cœles'tis (xli. 1695.) has i
colour, but half concealed in their
Africa'na (xxxv. 1431.) the flowers
(liv. 2721.) has broadly-ovate lea
formed of a green calyx and three
thyrsiflo'ra, from Brazil, the blue fl
or thyrsus. *Spirone'ma fra'grans*,
little white flowers, disposed in a l
cluster, and evolves a delicious od
little "ornamental-foliage" plant, s
descan'tia zebri'na.

CLXXII. THE COLCHICU

A small family of herbaceous En
extremely in general aspect, and ar

generally poisonous, a circumstance the more remarkable from Endogens being for the most part free from noxious principles. The list is headed in this respect by the *Vera'trum* or Black-hellebore, a plant with large oval leaves, which are strongly ribbed, and a great pyramidal panicle of insignificant and unisexual green flowers.

Two species British.

1. Flowers resembling those of the crocus, and appearing in the autumn; the perianth with a slender and subterranean tube 3—4 inches long, and six elliptical and spreading segments, of a broken reddish-purple colour. Leaves (not developed until the spring) broadly-lanceolate, 8—10 inches long, and 1 or 2 inches broad. Root a large cormus, invested with black membranes. COLCHICUM.
2. Flower stem about 6 inches high, and terminating in a little head or spike of minute yellow flowers. Leaves chiefly radical, 1—2 inches long, and vertically flattened. Anthers introrse. TOFIELDIA.

HABITATS AND DISTRIBUTION.

1. COLCHICUM—*Col'chicum autumna'le.*

Meadows and pastures; widely scattered, and in some parts, both of England and Ireland, very abundant. In Scotland, doubtfully wild. Gloucestershire, between the Severn and Wye, very plentiful. Fl. September, after the leaves of the current year are dead; the capsule remaining concealed in the ground during the winter, and making its appearance towards May, along with the foliage of the new season.

E. B. ii. 133; Baxter, i. 17.

2. TOFIELDIA—*Tofield'ia palus'tris.*

Mountain-bogs, and on the black and boggy margins of pools and rills in the north of England, Scotland, and Ireland; not uncommon. Frequent in the Highlands. Fl. summer.

Curtis, iii. 481; E. B. viii. 536; Baxter, iii. 227.

Sometimes called the Scottish Asphodel.

In gardens, the colchicum is often common, and frequently mistaken for the autumn crocus, being deficient, like the latter, in the decorum of green leaves, and similar in figure and colour. There is a variety with greenish flowers, and another in which they are partially double. The other representatives of the family, none, however, often met with, or much cared for, are *Uvula'ria*, in several species, (Bot. Mag. xxiv. 955, xxviii. 1112, xxxiv. 1402.) *Vera'trum*, already named, (xxiv. 963, xxvii. 1096.) *Helo'nias*, (xx. 747.) *Melan'thium*, (xxxii. 1291.) *Asagræ'a*, *Bulboco'dium*, (v. 153.) *Tricyr'tis*, *Merende'ra*, (lxv. 3690.) a pretty little flower like a purple crocus; *Schelham'mera undula'ta* from New South Wales, with small purple stars on the summit of a slender stem; *Burchar'dia umbella'ta* from New Holland, the beautiful flowers of which are whitish-green; and *Xerophyl'lum asphodeloi'des*, the last-named perhaps the most deserving of any.

upon the surface of the wa
rudiment of a stem, a large cluster
purple flowers. The roots, which d
over their whole surface with horizo
of ivy-stems, and at the tips have ca
roots of Lemnas. The leaves are a
2—4 inches across, and more or les
petioles, especially the inner ones,
below the middle, being internally c
air, so as to serve as floats. In the
scape 12 inches high, and bearing a
tiful light-purple flowers, clouded in
a bright yellow spot in the centre o
project, and the five lower segment
glance this lovely plant might be
readily in a warm greenhouse, and d
large aquarium. Other elegant spe
tedé'ra corda'ta, and *Eichhor'nia spec*

CLXXIV. THE ALETRIS

Very curious plants, indigenous to
and Australia, and numbering abo
herbaceous, with fibrous roots, and u
markable in usually having their flow
surface. The perianth is regular, wi
adherent to the ovary

perianth is 3—4 inches long, tubular, curved outwards, split for its whole length upon the under side, the lobes reflexed, and the stamens projecting. Along with the stem, the pedicels, the bracteas, and the ovary, it is thickly clothed with long soft hairs that render the surface velvet-like; those of the stem, at least of the lower portion, greenish, and those of the flower and adjacent parts, pale red, or sometimes partly green and partly crimson. There are several other species, as *Anigozan'thos coccin'eus*, scarlet; *hu'milis*, crimson; *flav'idus* and *ru'fus*, brownish-green. The most funereal is the *fuligino'sus*, the velvet of which is black, while the uncovered part of the flower is lemon-coloured;—and the handsomest, the *tyrian'thus*, the branching stems of which rise four feet high, the velvet of its great bunches Tyrian purple, and the lobes of the perianth straw-colour. All, except *hu'milis*, are so far hardy that they may be planted out in the open border during summer, and though infrequent, deserve a place in every conservatory. *Hæmodo'rum*, (Bot. Mag. xxxix. 1610.) *Ale'tris*, (xxxiv. 1418.) *Barbace'nia*, (liv. 2777.) and a few others are known to our greenhouses, but seldom seen.

CLXXV. THE PINEAPPLE FAMILY.—*Bromelia'ceæ.*

Handsome and very remarkable herbaceous plants of the tropical parts of America, where they grow chiefly as epiphytes, the short stem resting on the bough of a tree, and the long roots dangling in the air like those of aërial orchids. The leaves are long and narrow, usually very numerous and crowded, as in aloes, either fleshy, or hard and dry, channelled, and in the greater portion specially characterised by being scurfy upon the surface, or curiously banded. They are further noted for being spinous at the points, and more or less so along the margins, the thorns sometimes attaining great length and strength. The inflorescence is generally racemose or panicled, usually gay, and often splendid, so that many species are to be found in hothouses, especially of the genera *Pu'ya*, *Dasyli'rion*, *Vries'ia*, *Pitcairn'ia*, *Dyck'ia*, *Pourre'tia*, *Æchme'a*, and *Tilland'sia*. The flowers are in all cases hexamerous and with six stamens, generally small, but often provided either with peduncles or with great bracts that in vividness of colouring make ample amends; the ovary is either inferior or superior, and the fruit usually capsular. In the pine-apple, however, everything belonging to the inflorescence, together with the stem, is blended together, forming a succulent mass, and technically termed a "sorosis." This incomparable fruit, the production of the *Ananas'sa sati'va*, was first successfully cultivated in England in 1719. The crown of foliage is unique,

has scarcely any proper stem, but
long-subulate leaves, lifts up a flo
upon which gradually become shor
imbricated and concave, till at las
long, every bract now deep yello
tubular white flower, the whole
Bri'za max'ima, enormously enlar
purpu'reo-ro'sea (lxi. 3304.) has a su
and calyces, and purple corollas.
erect racemes of copper-coloured
3186.) is red and green. Other kir
the transverse coloured bands and
us of the beautiful seaweed called
pic'ta we seem to have a terrestri
outer leaves recurved, and the you

Many of this family, it may b
caulent leaves so disposed as to fo
which water collects, as happens ir
and in several *Tilland'sias*. The
hand, is filamentous, and hangs fr
gray lichen.

CLXXVI. THE BANAN

Splendid herbaceous plants of the
figure and stature. *Mu'sa*, the pri

6—9 feet long, by 2 feet in breadth, and arching away from it magnificently. It is by the successive and gradual evolution of these great leaves that the stem is built up, the latter consisting only of the consolidated bases of the long petioles. Internally it is soft, white, and succulent, and crammed with great compound spiral vessels that when stretched out, resemble ribbons, and so strong that if a small piece of the stem be snapped in two, they suspend the separated portion like vertical cords, and seem a thousand threads of white silk. The veining of the leaves is remarkable and very handsome. A strong central vein proceeds from the base to the obtuse apex, and right and left from this flow innumerable parallel veins, at first nearly at a right angle, but soon sweeping elegantly upwards, in a curvilinear manner, and losing themselves in the margin. The flower-bud remains near the root until the plant has attained its full size, nestling in the heart of the *quasi*-stem, and then pushes upwards, its appearance at the summit being shortly preceded by the evolution of one or two leaves smaller than the others. When developed, the inflorescence hangs out in the form of an immense, rounded, and pointed raceme of crimson bracts, under which are concealed numberless though rather inconspicuous blossoms. These, in due time, are succeeded by cylindrical fruits shaped like the finger, but 6—8 inches long, an inch and a half thick, and slightly curved. When ripe, they are pale yellow; the thick green skin comes away readily, and inside is found a finger-like mass of delicate but firm pulp, in which are combined the flavour of the pineapple and the pear. No tropical fruit ripens more readily in Britain, and in large conservatories it is quite a common thing to see one of the vast clusters above our heads, half concealed in the green luxury of its foliage. The special character of the plantain consists in the surface of the stem being striped and spotted with purple; the fruit also is shorter and rounder.

Besides the true *Mu'sas*, there are in opulent collections superb flowering-plants of this family called *Strelit'zia* and *Helico'nia*, the former from the Cape of Good Hope, the latter from the East Indies.

CLXXVII. THE GINGER-PLANT FAMILY.—*Zingibera'ceæ.*

Tropical herbaceous plants; generally speaking of the highest floral beauty, and remarkable for the aromatic qualities of their large and creeping root-stocks. The leaves are at once parallel-veined and feather-veined; that is to say, a strong midrib runs from the base of the leaf to the apex, with innumerable smaller veins flowing from it in

however, abundantly sufficient
in both families, are usually sin
of the large leaves. The flowe
erect racemes, occasionally *quasi*
within spathaceous and membra
coloured, and then eclipse the
perianth is hexamerous, and alw
rudimentarily present, but two of
the ovary is inferior and 3-celled

Put in contrast, the differenti

a. Antheriferous stamen opposite
whorl, and the anther 2 celled
b. Antheriferous stamen lateral an
one of the lobes.

Of the former, there have
tuting the genera *Zin'giber*, *Cur*
Eletta'ria, *Hedy'chium*, *Reneal'm*
several others, some of the spec
hothouse. Except for the folia
glance be taken for Orchids,
Mantis'ia saltato'ria, commonly
girls." *Hedy'chium corona'rium* (
popular with cultivators) is stri
large blossom consisting of three
a half in length, two white and

in contact with its inner surface. The odour is so delicious, so powerful, and so lasting, as to have deservedly gained for this lovely plant the name of a "garland-flower."

The *Maranta'ceæ*, instead of being aromatic, are noted for the abundance of their starch, several kinds of which appear in the shops as "arrow-root." The species are less numerous than those of the Zingiberaceæ, but the plants, which frequently have branching stems, are fully as handsome, and certainly more popular, being often of exceedingly rich foliage. The principal genera cultivated are *Maran'ta*, *Cala'thea*, *Can'na*, *Tha'lia*, and *Phry'nium*, especially the three first. *Cala'thea zebri'na* is a very common plant, at once known by its great oval and petiolate leaves, 12 inches long, the upper surface in two shades of green that follow the direction of the veins, and the under surface dull dark purple. *Can'nas*, comprising the plants called "Indian-shot," are still more frequent, and specially valuable as being adapted for planting out in the open border during summer, where they unfold their immense and richly-ribbed leaves in abundance, and, in genial situations, lift their tall and brilliant scarlet racemes till touched by frost. The finest species is *Can'na iridiflo'ra*. The best of the *Maran'tas* are *vitta'ta*, *variega'ta*, *zebri'na*, and *rega'lis*.

CLXXVIII. THE TACCA FAMILY.—*Tacca'ceæ.*

Perennial herbaceous plants of the South Sea Islands and the damp woods of India and other countries on the borders of the Indian seas. In habit they resemble the *Ara'ceæ*, but in the structure of the flowers are totally different, having a petaloid, tubular, and epigynous perianth, with six regular segments, and six stamens. The roots are tuberous; the leaves all radical, with long petioles, and curving parallel veins; the flowers are borne in umbels, upon scapes 12—18 inches high. *Atac'cia crista'ta*, one of the most curious plants in nature, has a unilateral and half-pendulous umbel of 12—20 brownish-purple flowers not unlike those of the asarabacca, but nearly truncate, and on slender peduncles about an inch and a half in length. Intermingled with the floriferous peduncles, or perhaps rather behind and laterally, are many more abortive ones, attenuated to the length of at least a foot, and hanging down like thin straight hair, a lock upon either side, while at the back of all stand up two enormous and vertical bracts, shaped like the spathe of the Arum, but flatter, and of a lurid greenish purple colour. *Tac'ca integrifo'lia* (Bot. Mag. xxxvi. 1488.) is now referred to the same genus, under the name of *Atac'cia as'pera.*

perianth, are disposed upon the
"spadix," the latter being enclo
and bract-like leaf called a "spa
coloured. All the species are he

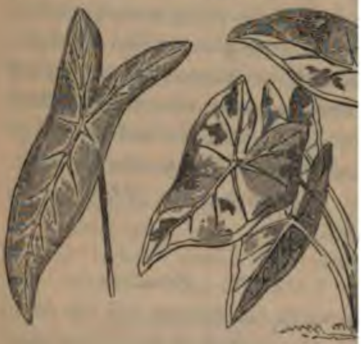

Fig.
Foliage of

height is sometimes 12—15 feet, a
the banks of the Amazon, which M
mon English Arum in figure, but w
diameter at the base. In the tropic
The leaves are hastate or arrow-shap
Exogens; occasionally they are divid
times they have large and irregular h

the gardener, though, when in full bloom, they often evolve a powerful and disagreeable odour, recalling that of Aristolochias and Stapelias.

One species British.

Leaves radical, on long petioles, the blade arrow-shaped, 2—5 inches long, pointed, glabrous and glossy, and frequently splashed with purple spots. Inflorescence at first a little green obelisk, rising from the middle of the tuft of leaves, 4—5 inches high, tapering to a point, and contracted, near the base, like a waist. With the aid of a penknife, the obelisk is found to consist of a green spathe, closely wrapped round the young spadix. By degrees the former uncurls, disclosing when quite open, a beautiful crimson or purple club, about two inches long, and the thickness of a quill, over which it arches like a canopy. At the base of the club, which here tapers into a stalk, and is concealed by the unexpanding part of the spathe, there is a zone of fine white hairs. Below this there is a dense band of sessile and reddish-purple anthers; and below this again a band of pale yellow ovaries, resembling little beads. The club, which is sometimes of a delicate buff colour, is merely ornamental. As the summer advances, the leaves, spathe, and club die away and disappear, the flower-stalk is considerably lengthened, and the ovaries grow into scarlet berries the size of currants, the cluster becoming 2—4 inches long, and very conspicuous. Sometimes the spathe has dark spots upon the inner surface, resembling those of the leaves; another variety has the spathe marked with faint white lines.

Common Arum.

HABITATS AND DISTRIBUTION.

Common Arum—*A'rum macula'tum.*

Woods, groves, and shady hedgebanks; common in England and Ireland, but becoming rare north of the Tweed. Fl. March—May. Berries ripe in August, and remaining till November.

Curtis, i. 136; E. B. xix. 1298; Baxter, iv. 261.

The gems of this family resolve into two classes,—those distinguished by exquisite painting of the leaves, and those marked by splendour of the spathe and spadix. Of the latter section, the most familiar is the handsome parlour and cottage-window plant commonly called the "Trumpet-lily," botanically *Richar'dia Æthio'pica*, a native of the Cape of Good Hope. The smooth round succulent stem is generally about 2 feet high, and bears on its summit a cream-white vase, the margins of which overlap at the base, but gradually recede outwards, the higher portion expanding widely and curving elegantly, and eventually tapering to a point, the extreme length and breadth being 6—8 inches. The outward roll of the spathe discloses the upper portion of the spadix, which stands in the centre like a column of gold, and is often powdered with white pollen from the innumerable anthers that stud the surface, while at the base is found a zone of naked ovaries resembling those of the Arum. From the base of the stem arise five or six broad and arrow-shaped leaves, supported on stalks of the same length, and remarkable for the readiness with which they distil water supplied to the roots, a few minutes

tostig'ma, so that the light seems to pa
—or in others, richly suffused with dee
towards the margin. In some varieties
and in others the green leaf seems to h
the surface. Placed round floating gard
plants, by their contrast with the level
ness of the latter and have their own
flowers, when they appear, present spa
but often highly-coloured, as in the *Ca*
Mag. xvi. 3728.) the spathe of which
paler outside, and protects a short thic
peltate and whitish anthers, and on th
pistils. The leaves of this splendid s
pinnatifid lobes, which spread horizon
high, and blotched with purple. In the
mum, (lxi. 3314.) the spathe is white ab
evolves the odour of the *O'lea fra'grans*,
clothing of the upper portion of the spa
Caladiums are distinguished from the
the female flowers are also confined to th
a certain space above them, but the ex
sterility or abortion, and projects like th
in flower, the Caladiums may be told
annual leaves;—the Alocasias by their
and by their foliage enduring longer.
plant. The great leaves are suspended v
arms of knights, every one of them 12
the surface dark, lustrous, curiously em
the produce of a plant. Many other m

CLXXX. THE SWEET-FLAG FAMILY—*Orontia'ceæ.*

A small family of herbaceous plants, by some botanists combined with the Araceæ, but differing in the possession of a perianth, though very minute, and in the flowers being uniformly bisexual. The spadix is usually quite as remarkable as in the Araceæ, but the spathe in many instances not at all so, and the plants, instead of being acrid, are in several cases aromatic and wholesome.

One species British.

A reed-like aquatic, with a stout rhizome that creeps horizontally in the mud, to the length of 18 inches or more. Leaves erect, 2—3 feet high, grass-like, about half an inch broad, the midrid nearer to one margin than to the other, and the edge of the narrower portion crimped or puckered. Flower-stem erect, simple, nearly as tall as the leaves, and flattened at the sides. Apparently half way up, but in reality at the summit, protrudes the spadix,—a body about as large as the fore-finger, cylindrical, tapering, light greenish-brown, slanting upwards, and the surface presenting a mosaic of minute hexagons, disposed in contiguous spiral lines, every hexagon being a perfect little flower, with minute perianth, six stamens, and a solitary ovary. When crushed or bruised, every part of the plant, rhizome included, emits an aromatic odour like that of myrtle. COMMON SWEET-FLAG.

HABITATS AND LOCALITIES.

COMMON SWEET-FLAG—*Ac'orus Cal'amus.*

Borders of ponds, clear ditches, and on the margins of slow rivers, usually growing just far enough in the water for the flowers to be inaccessible without baring the feet. Generally distributed, and in some parts of England very plentiful, as in the valley of the Thames, from Hampton Court upwards. Whether truly indigenous, however, is doubtful. Runnymede, abundant. Fl. June, July.

E. B. v. 356; Baxter, v. 330.

The garden representatives comprise the *Po'thos fœt'idus* of Bot. Mag. lx. 3224, now called *Symplocar'pus* or *Dracon'tium*, an old-fashioned North American plant, curious only in its large greenish-purple spathe; the *Cal'la palus'tris*, a plant resembling the Trumpet-lily or *Richar'dia Æthio'pica*, described on the preceding page, but very much smaller, and without a golden spike in the centre; and in greenhouses, *Po'thos argy'rea* and others of the same genus—plants that twine round pillars, and scramble up trellis-work, and at first sight are not unlike the periwinkle. The merit of these lies only in their foliage, which is sometimes prettily variegated. *Anthu'rium* is esteemed for the same kind of beauty. Other non-climbing species of *Po'thos* and the allied genera are also in cultivation by the curious in foreign oddities. The name of *Calla*, it may be useful to add, though popularly applied to the Trumpet-lily, is now restricted to the genus of the present family which contains the *C. palus'tris.*

like boughs; and the abundan
almost beyond counting. A si
above twelve thousand blossom
the Orinoco bears eight thous
man, as donors of food, raimen
par with their grand appearance
ivory, coco-nut matting, piaçava
wood of various kinds, coquilla
nuts, and many other articles
them to be of an importance by
selves; while to the inhabitant
often equivalent to that of corn

Belonging, however, almost
globe, and hardly extending bey
north, in Britain these glorious
vatories. *Chamæ'rops excel'sa*,
the only species that can endur
and even when under glass, it i
mounted with a cupola, into w
crowns, that their noble forms
The principal collections are at
there is no Botanic Garden that
of the most interesting. Such a
the toddy-palm, *Caryo'ta u'rens*,
and the fan-palm, in two or thre

able building, the altitude to which they rise so vastly exceeding that of all other conservatory plants.

The ordinary figure of a palm-tree is that of a slender, erect, and extremely lofty stem, destitute of branches, and bearing upon the summit a crown of prodigious leaves, which are usually either feather-like or fan-shaped, and supported on long petioles. While the plant is quite young, of course the tuft of leaves is smaller, and near the ground; as growth proceeds, the outer or older ones gradually decay, and new ones are developed in the interior of the crown, (just as we see in ferns,) and the stem being simultaneously extended upwards, in a few ambitious years the mass of verdure is above our heads, going on, if favourably circumstanced, to the height of 30, 50 or 100 feet. The only other example of this figure among arborescent plants is the Papaw-tree, *Cari'ca Papay'a* (lvi. 2898.); miniatures of it in herbaceous plants occur, however, in several species of *Cype'rus*, as will be noticed in the proper place. In some kinds of palm the stem is scarcely or not at all developed; the leaves then constitute an immense radical tuft, like that of the common shield-fern, as happens in the *Attale'a spectab'ilis;* sometimes, on the other hand, the stem is reed-like, and of so vast a length as to lie about upon other plants for support, much in the same way that the stems of brambles do in our English hedges. This occurs in the genus *Cal'amus*, which connects the palms with the grasses, and the dried stems of which constitute the common yellow cane of the shops. A few species branch and divide in a dichotomous manner; in others, lateral sprouts are sometimes developed from old leaf-axils; a few others again are climbers, as instanced in the very curious *Desmonc'us* of South America, the pinnate leaves of which terminate in a barb of recurving spines that answers the purpose of a tendril. But these are all exceptional. The palm-tree emphatically, the soul-moving emblem of the south and east, is in figure represented in the classical column which was suggested by it, tall, round, and erect; every pillar of the ancient temples of Greece and Rome is the stem of the palm-tree copied in stone, just as the swollen columns of the still more ancient Egyptian temples have their prototype, (in this case special,) in the ventricose trunk of the *Boras'sus Æthio'pum*. Not only was the model for the pillar found in the palm-tree—the capitals of the columns of the great temple of Edfoo were evidently copied from the leaf-crown.

The flowers of the palm-trees are like those of most other Endogens, trimerous, regular, and usually with six stamens. Most of the species are unisexual, and not infrequently they are diœcious. The separation of the sexes of the date-palm was observed in extremely ancient times, and recorded by Herodotus, a circumstance of no slight interest in the history of vegetable physiology, since not till over twenty centuries later was the fact of vegetable sex established and admitted in science. While young, the mass of inflorescence is enclosed in a sheath or "spathe;" the flowers individually are seated on a branched and scaly spadix, and this, along with the spathe, forms one of the essential characters of the family. The fruit is extremely various, and usually of three carpels (though one or two of them, as in the coco and coquilla-nuts, are often suppressed while ripening); the embryo is minute, and lodged in a cavity of the albumen. How remarkably solid the latter part is capable of becoming in this family, is illustrated in the substance called "vegetable ivory," named above, and which is the produce of the South American *Phytel'ephas macrocar'pa.* The estimated number of species of palms is a thousand, very many of which are, however, as yet imperfectly known;—and the sole European representative, the *Chamæ'rops hu'milis*, which occurs near the southern coasts. The student wishful to observe their mode of germination may readily do so by procuring a coco-nut in incipient growth, (known by the protrusion of a white horn-like body from one of the eyes,) and planting it on a hotbed, or in a hothouse. Date-stones grow nearly as well under similar treatment, and in germination prove eminently instructive.

CLXXXII. THE REED-MACE FAMILY.—*Typha'ceæ.*

Herbaceous plants, growing in ditches, ponds, and swamps, with long, linear, grass-like, and firm but pliant leaves; and stout cylindrical stems, which are jointless and succulent, and 2—4—6 feet high, unless submerged. The latter condition is unusual; in general the stems are elevated considerably. Flowers unisexual, monœcious, small and incomplete, but clustered into dense globular heads, or cylindrical spikes, that in either case show conspicuously. Sepals three or six, very minute, sometimes a mere bundle of hairs, but arranged in regular whorls. Petals absent. Stamens three or six, usually with long and thread-like filaments. Ovary solitary and superior, tapering into a slender and simple style. Fruit a small angular achenium.

Two genera only are known, comprising about a dozen species, which are very generally diffused in the northern parts of the world. Omitting the *Ty'pha minor* of E. B. xxi. 1457, not now found, five of them may be accounted British.

A.

Flowers in dense cylindrical spikes, which are a foot or more in length, and formed of two distinct portions, the upper one male, the lower one female. Upper or male portion apparently consisting of innumerable yellowish anthers. Lower or female portion consisting of innumerable minute ovaries, packed as closely as the stamens, and enveloped in tufts of soft brownish hairs, which render the mass velvety both to the eye and to the finger. The upper half decays early, and drops away or leaves a mere stump; the female half becomes a dark-brown velvet-like club, 4—8 inches in length, bearing, with its long round stem, no distant resemblance to a cannon-sponge. Whole plant glaucous. Stems perfectly simple.

Spike uninterrupted, the male portion commencing immediately upon the termination of the female. Leaves flat. Stems 2—4—6 and even 8 feet high. Club an inch in diameter. 1. COMMON REED-MACE.

Upper or male half of the spike separated from the female portion by about an inch of naked stem. Leaves somewhat concave in front. Whole plant smaller and more slender than the preceding. 2. SMALL REED-MACE.

B.

Flowers in dense globular heads, which vary from half an inch to an inch in diameter, and are disposed rather distantly upon the upper portion of the plant, so as to form a small panicle or raceme. Upper heads all male, the stamens with long, white, flaccid filaments; the lower heads all female, larger than the males, and composed of a number of firm, green, sessile, pointed, and prominent ovaries. Leaves shooting considerably above the inflorescence. Plant in no degree glaucous, usually bright green.

Stem 2 feet high, the flowering portion branched, and every branch bearing several heads. Leaves with concave sides. 3. COMMON WATER-BURR.

Stem simple, and, as well as the leaves, erect, and rising about 18 inches out of the water. Leaves with flat sides. 4. SMALL UNBRANCHED WATER-BURR.

Stem simple. Leaves floating and pellucid. Flower-heads very few, the male generally solitary. 5. FLOATING WATER-BURR.

HABITATS AND DISTRIBUTION.

1. COMMON REED-MACE—*Ty'pha latifo'lia.*

Borders of lakes and meres, ponds and marshy places; common everywhere, except in the Highlands of Scotland. Fl. July.

Curtis, i. 206 (as *Ty'pha ma'jor*); E. B. xxi. 1455.

Often erroneously called "Bull-rush," but the true Bulrush is the *Scir'pus lacus'tris*, a member of the Sedge-family. The name is applied in fact to several different plants. The ark of bulrushes in which Pharaoh's daughter found the infant, was constructed probably of the *Papy'rus*, a description of which will be given by-and-bye. The pollen of this plant, like the spores of the *Lycopo'dium*, is inflammable. It would seem, however, that pollen is usually so, and that the property has been observed in that of the Typha, simply from the ease with which large quantities are procurable. The *Ty'pha* is the plant introduced by old painters of the Crucifixion, to represent the sponge "dipped in vinegar."

2. Small Reed-mace—*Ty'pha angustifo'lia.*

Ponds, marshy places, pools in woods, and old clay-pits, often covering acres in the shallows, and when shaded, nearly 8 feet high. Common, but not so general as the *latifo'lia*, and in Scotland apparently not found. Frequent in Cheshire. Fl. July.

Curtis, i. 207 (as *Ty'pha mi'nor);* E. B. xxi. 1456; Baxter, v. 377.

3. Common Water-burr—*Sparga'nium ramo'sum.*

Ponds, ditches, and slow streams; everywhere. Fl. July, the prickly heads in August and September.

Curtis, ii. 358; E. B. xi. 744.

For a clear idea of the structure of the leaves of Endogens, the young botanist cannot do better than examine a full-grown specimen of this plant. Pull it bodily out of the water, and for some distance above the root the parts will be found to be nearly transparent, and with every fibre plainly exhibited.

4. Small unbranched Water-burr—*Sparga'nium sim'plex.*

Similar situations; tolerably common, but not so widely diffused, and in Scotland rather rare. Fl. July, August.

Curtis, ii. 359; E. B. xi. 745; Baxter, iv. 276.

5. Floating Water-burr—*Sparga'nium na'tans.*

Ponds, ditches, and stagnant waters, such as those of old clay-pits; not very common, though generally distributed. Fl. July, but very seldom.

E. B. iv. 273.

CLXXXIII. THE SCREW-PINE FAMILY.—*Pandana'ceæ.*

Remarkable trees and shrubs of the shores of the Indian islands. In habit they are usually palm-like, but with a tendency to branch; they may be compared also to gigantic Bromelias, the leaves, which are long and linear-lanceolate, being amplexicaulent, and sheathing at the base. These organs are usually imbricated in three great spiral ranks, whence the name of screw-pine, and are almost always severely spinous along the margins and down the keel;—possibly they may be only phyllodia, since the nearly-allied *Cyclan'theæ* of Peru and Brazil have the fanlike or pinnate foliage of genuine palms. The flowers are borne on a spadix, furnished with numerous spathaceous bracts, the inflorescence resembling that of a *Sparga'nium*. Hence these plants may be regarded as a link between the Palms and the Typhaceæ. The species, estimated at 75, are represented in our conservatories by the common screw-pine, *Panda'nus odoratis'simus*, also by the *Carludovi'ca*, (Bot. Mag. lvii. 2951.) *Freycine'tia*, *Cyclan'thus biparti'tus*, &c.

CLXXXIV. THE DUCKMEAT FAMILY.—*Lemna'ceæ* or *Pistia'ceæ.*

Minute aquatics, represented in Britain by a few species of the simplest of the half-dozen genera. The true duckmeats are the simplest, not only of Endogens, but of all flowering-plants whatever, consisting of nothing more than thin green plates of cellular tissue, which float upon the surface of standing water, the plates either growing separately, or cohering two or three together by their edges, and with long hair-like roots hanging from their under-surfaces. When several plates are united, as in Fig. 198, those at the sides are the younger ones, having arisen from buds developed from the margin of the parent plate. The multiplication of the plates is rapid and constant, so that the pond or other water which the plant inhabits is usually covered with a level green carpet that conceals the liquid below. At other times they are seen mingled with the green asteroids of the Callitriches. The flowers are put forth, like the buds, from the margins of the plates, and consist of nothing more than a delicate membranous bag, two stamens, and a solitary ovary, though the latter part is sometimes absent.

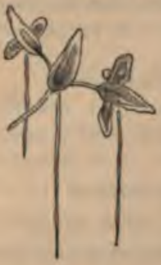

Fig. 198.
Lem'na trisul'ca (natural size).

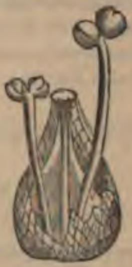

Fig. 199.
Flower of Lemna (highly magnified).

What claim these mere specks of vegetation have to be placed so near Palms and Caladiums, may naturally excite question. They are classed with the spadiceous plants, yet no spadix is developed. On comparison with more perfectly-formed exotic genera, it becomes evident, however, that the type of their structure is the same as that of the Arum, only that here it is utterly depauperated, or reduced to the lowest possible condition. The minute membranous bag above described is the spathe; the flowers are not, as appears at first sight, bisexual, but unisexual and without perianth, comprising a solitary male, with one or two stamens, and a solitary female close beside; and of the spadix nothing more is present than the minute surface from which the last-named organs arise.

It is remarkable in most of the species of this little family that they abound both in starch and in phosphate of lime. All of them are excellent for the aquarium, keeping the water clean, and tempering the light of the sun.

A.

Roots growing in clusters. Plates broadly ovate or circular, ¼ to ½ an inch long, and nearly as broad, opaque, and on the under surface purple. Root-sheaths sharply pointed. 3. Great Duck-meat.

B.

Roots solitary, *i.e.*, only one root to each plate, and the sheath at the extremity blunt and rounded.

- *a.* Plant long and narrow, very thin, pellucid, minutely toothed at one end and tapering into a little stalk at the other, with two young ones usually growing from opposite sides, near the base, and at right angles with the principal plate. 2. Ivy-leaved Duckmeat.
- *b.* Plates broadly-oval and opaque.
  - Plates flat, thin, scarcely convex underneath. 1. Common Duckmeat.
  - Plates thick, spongy, and almost hemispherical underneath. 4. Gibbous Duckmeat.

HABITATS AND DISTRIBUTION.

1. Common Duckmeat—*Lem'na mi'nor.*

Covers every stagnant pond with a close film of minute green spangles. Fl. summer, but not commonly.

Curtis, iii. 440; E. B. xvi. 1095; Baxter, vi. 424.

2. Ivy-leaved Duckmeat—*Lem'na trisul'ca.*

Ponds and ditches, chiefly near the edges; common, but not universal, and in the north rather scarce. Fl. summer, but very rarely.

Curtis, iii. 439; E. B. xiii. 926.

3. Great Duckmeat—*Lem'na polyrhi'za.*

Ponds, pools, and stagnant waters; widely dispersed, but rather rare. Near Manchester not uncommon. Fl. (in Britain) scarcely ever.

E. B. xxxv. 2458.

4. Gibbous Duckmeat—*Lem'na gib'ba.*

Similar situations; but very uncommon, and the rarest of the species. Certain ponds near Manchester contain all four species side by side. Fl. as *L. trisul'ca.*

Curtis, iv. 583; E. B. xviii. 1233.

Pis'tia Stratio'tes is a pretty little tropical plant, in which a distinct stem and leaves are present, the former with runners like those of a strawberry, and the latter shaped like those of the *Planta'go me'dia.* The spathes are axillary, and the male and female flowers situated upon distinct parts of its central line. Plentiful in the tanks at the Crystal Palace, Sydenham, and not uncommon in good private aquariums.

ENDOGENS.

SECTION 3.—GLUMACEOUS.

CLXXXV. THE GRASS FAMILY.—*Gram'ina.*

In its popular application, and especially with farmers, the word "grass" is synonymous with *herbage.* Botanists restrict it to a particular family of Endogens, represented in the chief components of hay, and in the invaluable plants which yield corn in its various kinds, as wheat, rice, barley, oats, rye, millet, and maize; also in the bamboo and the sugar-cane, all of which latter are in structure precisely similar to the ordinary grasses that cows eat, but with their stems or seeds developed to a great size. The corn-producing species are called the *Cerea'lia*, in allusion to the mythological goddess Ceres, whose assigned province was the guardianship of the harvest. Often considered insignificant and "flowerless," and in northern and temperate latitudes rarely exceeding a yard in stature, many grasses are nevertheless of highly ornamental character, and in the tropics there are species that attain such vast altitudes as to flaunt their silken panicles above the trees that stand around them. In habitat the various species differ no less greatly than in their proportions, many growing in water, and not a few close to the sea. In value they are second only to the Palm-trees, supplying not alone pasturage for the herbivorous animals, material for bread in the Cerealia, and sugar, but a variety of materials that can be turned to useful account, and also subserving physical uses to the soil. The number of species moreover is exceeded but seldom, being probably not much short of four thousand, while the number of individuals is immeasurably greater than of any other family, in northern latitudes forming that cheerful evergreen carpet which the eye and the body alike repose on with so much content.

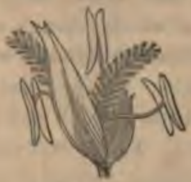

Fig. 200.
Flower of Grass (much enlarged).

The stems of these interesting plants (in the smaller kinds termed "straws," and in the larger ones, "reeds" and "canes") are cylindrical, jointed, and usually erect. Internally, they are for the most part hollow,

narrow, and pointed. Someti
times wire-like, sometimes so
blade of a knife. They consis
corresponding to petiole, and
form a sheath, the edges of wh
the upper part is free, and forms
stem at a considerable angle.
away, on the inside, there is
pendage called the "ligule." T
greenish bracts. These, howeve
circles (as the sepals and petals
stand alternately upon the ax
other. The stamens are almos
or even solitary; the filament
capable of sustaining the weig
large, broad, "versatile," and
mities, so as to make the bod
extremity. Interior to them i
ovule, and supporting two lar
feathered, and sometimes, as i
fruit resembles a little seed, as f
or barley. The inflorescence i

are perhaps extinct. Of these hundred, only about sixty are likely to come before the student who keeps near home, and scarcely forty enter copiously into the ordinary vegetation of any district that is not singularly favoured. *Trit'icum crista'tum* (E. B. xxxii. 2267,) and one or two others are not now reckoned.

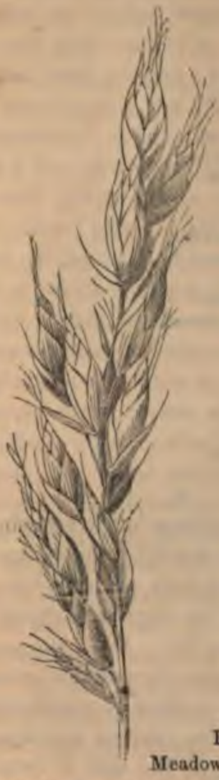

Fig. 201.
Meadow Brome-grass.

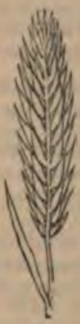

Fig. 202.
Barley-grass.

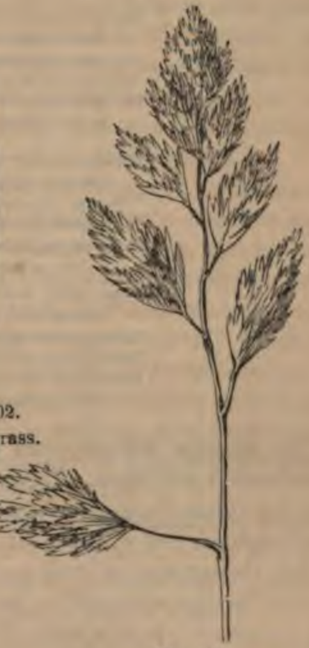

Fig. 203.
Rough Cock's-foot Grass.

The dread of the difficulty of studying the grasses, which often deters young botanists, is thus practically reduced, as to the matter of number, by more than one half. That difficulty, after all, lies only in self-distrustfulness. Grasses, like everything else, become intelligible to earnest scrutiny, and their great beauty brings a ready reward. Many are known to everyone, whether botanically inclined or otherwise, as the quaking-grass, in its quaint brown tremor; the foxtail of the scented hay-field; and the tall reed of the swamp and river-side. The associations of the last-named give every accomplished mind delight in its presence, and may well crop out as they do in our best literature.

What was he doing, the great god Pan,
Down in the reeds by the river?
Spreading ruin and scattering ban,
Splashing and paddling with hoofs of a goat,
And breaking the golden lilies afloat
With the dragon-fly on the river.

* * * *

High on the shore sat the great god Pan,
While turbidly flowed the river,
And hacked and hewed as a great god can,
With his hard black steel at the patient reed,
Till there was not a sign of a leaf indeed
To prove it fresh from the river.

* * * *

"This is the way," laughed the great god Pan,
(Laughed while he sat by the river!)
"The only way since gods began
To make sweet music they could succeed."
Then dropping his mouth to a hole in the reed,
He blew in power by the river.

Sweet, sweet, sweet, O Pan,
Piercing sweet by the river!
Blinding sweet, O great god Pan!
The sun on the hill forgot to die,
And the lilies revived, and the dragon-fly
Came back to dream on the river.

* * * *

The principal difficulty with grasses lies perhaps in the securing of specimens in *full bloom*. These, however, are readily obtained upon a fine day, when, hung with their innumerable anthers, purple, white, or buff-coloured, and with the white plumes of the stigmas showing between, they present as lovely a spectacle as any lily. Study the *young* state of the plant after a while, but not at first, since the contrast between an unexpanded panicle and a full-blown one, is often so considerable, as happens with the common soft-grass, that long practice is necessary to identify them. From the middle of May to the end of October plenty are to be found in good condition, many species, such as the silver oat-grass, blooming twice, while *Po'a an'nua* is in blossom always. In the autumn it is very common to find grasses affected with "ergot," that is to say, blackish horn-like bodies, about half-an-inch in length, which protrude from the sides of the spikelets, and are caused by a minute parasitic fungus. On the mountains it is equally common to find grasses "viviparous," the greater portion of the spikelets, instead of containing flowers, having their bracteas much elongated, and becoming young plants, something in the same way that bulbs are produced in place of flowers by certain garlics. This is particularly the case with grasses essentially alpine, as Poa *alpi'na*, and *Aira alpi'na*.

Before proceeding to the analysis of the grasses, the student must observe that the entirely new and distinct structure of these plants requires the use of a few new terms to correspond.

The little clusters of blossoms which collectively form the spike or panicle are termed "spikelets." A spikelet may, however, contain no more than *one* flower.

The floral coverings which occupy the places held in other plants by the calyx and the corolla, are in the grasses called "glumes" and "glumelles." Of the former there are usually two, one attached to the axis a little above the base of the other, and termed the "upper" or "inner" glume, while the one underneath it is termed the "lower" or "outer" glume. Above the glumes are the actual flowers, 1, 2, 3 or more, sitting in notches of the main axis, and formed of "glumelles," one of which is lower than the other, usually larger, and furnished with a midrib, while the upper one is bifid at the apex, and has the edges membranous, inflexed, and ribbed. The midrib of the lower glume or glumelle often quits it, either at the apex, or a little way below, and becomes more or less elongated, constituting an "awn," which is sometimes so far extended as to form a bristle of several inches in length. In wheat and barley these awns are popularly termed the "beard." They are often of great service in discriminating the different species of grasses, but cannot always be absolutely relied upon, certain species being found both with awns and without them.

It is further important to observe that the appearance of grasses varies not only with the stage of their development, but is strongly affected also by the place of growth, and by moisture and dryness of soil. In the following key, the same grass is often inserted in several sections, so as to provide, as far as practicable, against the uncertainties these things give rise to.

PRELIMINARY ANALYSIS.

Section I.—Spikelets crowded into *heads* or *spikes*, which are *erect*, terminal, and *solitary*, and in figure either *ovoid* or *cylindrical*—p. 712.

Section II.—Spikes *umbellate*—p. 714.

Section III.—Spikelets disposed in *simple racemes*, which are occasionally spike-like, often flat-sided, and sometimes unilateral—p. 715.

Section IV.—Spikelets disposed in a more or less open *panicle*, and individually *one-flowered*—p. 716.

Section V.—Spikelets panicled, as in Section IV., but individually *two or more flowered*, and with *awns to some or all of the glumes*—p. 718.

Section VI.—Spikelets panicled, as in the preceding, and individually two or more flowered, but *destitute of awns*—p. 720.

Section VII.—Exceptional species. Feather-grass—p. 722.

SECTION I.

Spikelets crowded into *heads* or *spikes*, which are *erect*, terminal, and *solitary*, and in figure either *ovoid* or *cylindrical*. (In some, the spike is composed of many short and erect branches, disposed like those of a Lombardy poplar, and is then occasionally interrupted at the base; in a few others the spike is only *semi*-cylindrical.

A. *Spike semi-cylindrical*, nearly flat down the back, full and convex in front, and 1—4 inches long. Spikelets in sessile clusters, *the lowermost of every cluster flowerless, and resembling a little comb*, the others 3—5-flowered. No awns. Anthers purple. Stems 12—18 inches high. 76. CRESTED DOGS-TAIL.

B. *Rigid, rush-like grass of the seaside sandhills.* Stems 1—3 feet high, the underground portion creeping. Spike straw-coloured, 2—6 inches long, and tapering at each extremity. Leaves stiff, erect, glaucous, very sharp-pointed, and with involute margins. 32. SEA MAT-GRASS.

C. *Head short and thick*, shaped like a filbert, but longer, densely imbricated, and perfectly glabrous. Glumes large, pale, *variegated with conspicuous green stripes*, and remarkably winged at the back. Fruit large, yellowish, smooth and glossy. Stem 1—3 feet high. 11. CANARY-GRASS.

D. *Stamens only two*, large, and hanging out loosely. Stem 6—15 inches high. Whole plant perfectly glabrous. Spikes 1—2 inches long, brownish-yellow, rather glossy. Lower-glumes very pointed. Spikelets one-flowered. 10. SWEET-SCENTED VERNAL-GRASS.

E. *Spikes not exceeding half-an-inch in length*, and the whole plant only 1—3 inches high. Spikelets 5—10, purplish, somewhat unilateral, and *one-flowered*. 22. KNAPPIA.

F. *Spikelets surrounded by an involucre of awn-like bristles.* Spikes green, 1—2 inches long.

* Bristles rough with hairs that point forwards.

a. Upper glumes transversely wrinkled. 6. GLAUCOUS BRISTLE-GRASS.

b. Upper glumes not wrinkled. 5. GREEN BRISTLE-GRASS.

** Hairs of the bristles pointing backwards. 7. WHORLED BRISTLE-GRASS.

G. *Spikelets one-flowered, and the lower glumes without awns*, though sometimes finely pointed.

1. Lower glumes remarkably swollen and shining at the base. Spike 2—3 inches long, pale green, but of silvery or satiny lustre. Stem erect, 3—12 inches high. 31. GASTRIDIUM.

2. Lower glumes keeled or boat-shaped.

* Upper glumes with a fine awn upon the back.

† Annual. Lower glumes united as far as the middle. Stem 1—2 feet high, wholly erect. Spike 2—3 inches long, thin, pointed, slender, and purplish. 19. CORNFIELD FOX-TAIL.

(Spikelets collected into ovoid or cylindrical heads or spikes, and individually one-flowered. Glumes awnless; the glumelles awned.)

†† Usually perennial. Glumes free, or united only at the base.

a. Spike usually 2—3 inches long. Stems wholly erect, 1—2 feet high. Spike dense and rather obtuse; the glumes with short hairs upon the keel that render it soft and hoary. Awns prominent. Anthers purple or buff.
18. MEADOW FOX-TAIL.

b. Spike slender, purplish, and 2—3 inches long. Lower portion of the stems long and trailing, and remarkably bent at the joints. Awns slightly projecting.
20. MARSH FOX-TAIL.

c. Spike not more than an inch long. Stems erect. Awns scarcely projecting. 21. ALPINE FOX-TAIL.

** Glumelles without awns.

† Annuals. Stems 6—8—12 inches high.

a. Glumes lanceolate, their lateral veins prominent, and the keel ciliated. Spike ¾—1½ inch long, and tapering at the base. Stems numerous, 6—12 inches high.
15. SANDHILLS CAT'S-TAIL.

b. Glumes wedge-shaped, their lateral ribs inconspicuous. Spike slender, 1—2 inches long. 17. ROUGH PHLEUM.

†† Perennial. Glumes linear-lanceolate. Spike 1—3 inches long. 16. BŒHMER'S PHLEUM.

H. *Spikelets one-flowered, and the lower glumes awned*, or at least with rudimentary awns.

1. Awns long and conspicuous.

* *Spikelets three together*, sessile upon alternate notches of the rachis, and *one or more of them without flowers.*

† Flowers of the two lateral spikelets perfect; those of the middle one either absent, or with stamens only. Stem 2 feet high. Spike 3 inches long.
52. SYLVAN BARLEY-GRASS.

†† Flowers of the two lateral spikelets absent, or with stamens only; those of the middle spikelet perfect.

a. Lower glumes of *all* the spikelets awn-like throughout their whole length. Stem 2 feet high. Spike 1½—2 inches long.
53. MEADOW BARLEY-GRASS.

b. Lower glumes of the *lateral* spikelets awn-like; those of the middle spikelet lanceolate, and ciliated at the base. Stems decumbent, 6—12 inches long. Spike 3—4 inches long.
54. ROADSIDE BARLEY-GRASS.

c. Lower glumes of all the spikelets slightly dilated at the base, and all glabrous. Spike 1—3 inches long. 55. SEASIDE BARLEY-GRASS.

(Spikelets in ovoid or cylindrical heads or spikes, and one-flowered. Lower glumes with long and conspicuous awns.)

** *Spikelets all containing flowers.*

Spike ovoid, very pale, ½—1 inch long (in gardens cylindrical, and 1—2 inches), very soft with the copious hairs of the glumes, and with the long awns, which are bent, and project in all directions. Leaves broad, slightly hairy on both sides. Sheaths inflated. Stems 4—12 inches high. 23. HARE'S-TAIL GRASS.

Spike cylindrical, 2—3 inches long, shining yellowish-green, silky with the long hairs of the glumes, and thickly bearded with straight awns. Stems 12—18 inches high. 24. MONTPELIER BEARD-GRASS.

2. Awns inconspicuous, or only rudimentary. Outer glumes truncate, and broadly scarious below the point.

Spikes 2—4—6 inches long, perfectly cylindrical, obtuse, rough, and light glaucous green. Glume at least twice the length of its awn. Stems 1—3 feet high. 13. MEADOW CAT'S-TAIL.

Spike seldom an inch long, usually purplish. Glume usually shorter than its awn. Stem 6—12 inches high. 14. ALPINE PHLEUM.

I. *Spikelets two or more flowered.*

1. Glumelles awned.

* Awn arising from the back of the glumelle. Spike panicled, the branches short and erect. Flowers two. Plant tufted, 3—6 inches high.

Annual. Awns hairlike, shortly projecting. Spike ½—1 inch long. 38. VERNAL HAIR-GRASS.

Perennial. Awns thickened at the top, and shorter than the glumes. Spike 1—2 inches long. 40. GREY HAIR-GRASS.

** Awn terminal and very long. Spike broad, and mostly unilateral; the lower spikelet flowerless and comb-like, the other spikelets 2—5-flowered. Stem usually solitary, 18—24 inches high. Annual. 77. HEDGEHOG GRASS.

2. Glumes and glumelles awnless.

Small bracts at the base of the spikelets, which are sessile, and imbricated all round. Spike ½—1 inch long, slightly unilateral, broad, compressed, shining, blueish-gray. Stem 6—12 inches high. 101. SESLERIA.

No bracts. Spike 1—2 inches long, narrow, slightly interrupted below, with a fine silvery-gray gloss. Glumelles white and membranous. Stem 6—18 inches high. 100. SILVERY KŒLERIA.

SECTION II.

Spikes umbellate.

A. Spikelets *solitary* along the branches, but imbricated in two rows.

Branches usually 4—5. Stems 3—6 inches high. 47. DOG'S-TOOTH GRASS.

Branches seldom more than two, erect, straight, close together, and rising out of the sheath of the short uppermost leaf. Stems 10—24 inches high. Whole plant hard, tough, and rigid. 48. SPARTINA.

(Spikes umbellate.)

B. Spikelets *in pairs* along the branches.

Branches of the umbel 2—5 inches long, and usually 2—6. Stems decumbent, extending 1—2 feet. 3. Common Finger-grass.

Branches not above an inch long, and seldom more than three in number. Stems 6—12 inches. 4. Glabrous Finger-grass.

SECTION III.

Spikelets disposed in *simple racemes*, which are occasionally spike-like, often flat-sided, and sometimes unilateral.

A. Spikelets one-flowered and unilateral. Anthers white, looking as if extraneous, and accidentally attached.

Stems rigid, 4—5 inches high, lasting through the winter. Herbage bristle-like, forming dense, short, coarse, and rigid tufts. Plant very firm in the ground. Spikelets purplish and very slender. Style solitary. 50. Wire-grass.

Annual. Stems decumbent and much branched at the base, 3—12 inches high. Raceme 2—4 inches long, very smooth, usually incurved, cylindrical, and, before the flowers open, resembling the stem of a little rush; afterwards like a diminutive *Lo'lium peren'ne.* Spikelets almost embedded in the rachis, which readily snaps at the joints. 49. Lepturus.

B. Spikelets two or more flowered.

1. Spikelets 2—3 to every tooth of the flowering axis, which is 6—14 inches long. Stems 3—4 feet high, reed-like, and rigid. Leaves hard and rigid, spinous at tip, 1—2 feet long. Seaside plant. 51. Common Lyme-grass.

2. Spikelets disposed *singly* along the flowering-axis, which is 3—6 inches long, wavy, and notched, the spikelets standing in the notches.

* Spikelets with their *broadsides* next the stalk.

† Glumes nearly equal. Stems 2—3 feet high.

a. Root-stock creeping. Plant usually glaucous. Spikelets about 5-flowered.

Leaves flat. Glumes often awned. Rachis not brittle. 56. Couch-grass.

Leaves involute. Glumes always awnless. Rachis brittle. 57. Sandhills Wheat-grass.

b. No creeping root-stock. Stems tufted. 58. Dogs' Wheat-grass.

†† Glumes unequal. Spikelets nearly cylindrical, about an inch long, pointed at each end, and distant.

Racemes half-pendulous. Stems numerous, 2—3 feet high. Leaves very hairy. Herbage yellowish. Awns long. 61. Common False-brome.

Racemes erect and 2-ranked. Awns inconspicuous. Leaves nearly glabrous. 62. Pinnate False-brome.

(Spikelets disposed in a simple raceme, two or more flowered, and solitary along the axis.)

** Spikelets placed *edgeways* to the stalk, rendering the raceme *flat.*

† One empty glume at the base of every spikelet except the topmost.

Lower glume shorter than the spikelet. Stems 6—36 inches high. 59. COMMON RAY-GRASS.

Lower glume as long or longer than the spikelet. Stems 2—4 feet high. 60. DARNEL.

†† Two empty glumes at base of spikelets.

Perennial. Stems 2—3 feet high. Spikelets cylindrical, linear-oblong, placed obliquely to the wavy stalk. 71*. RAY-FESCUE.

Annual. Stems 2—3 inches high, rigid, and wiry. Raceme unilateral. 86. DWARF SEA-SIDE POA.

SECTION IV.

Spikelets disposed in a panicle formed of usually numerous though sometimes very few branches; the branches usually spreading, but sometimes erect, in the latter case rendering the panicle close and compact. *Spikelets individually one-flowered.*

A. Spikelets arranged along one side of the simple linear branches of the panicle, the branches two or more, erect, straight, and close together. Stems 10—20 inches high. Whole plant hard, tough, and rigid. 48. SPARTINA.

B. Numerous long green bristles interspersed among the spikelets. Panicle 1—2 inches long, with short branches in whorls of about four. Stems 1—2 feet high. Rare annual weed. 7. WHORLED BRISTLE-GRASS.

C. *Stamens two,* very conspicuous. Panicle ovoid, spike-like and tapering, yet compact; while young, brownish-yellow and glossy. No awns. Stems tufted, 12—18 inches high. Universal perennial meadow plant. 10. SWEET-SCENTED VERNAL-GRASS.

D. *Stamens three.* Panicle more or less loose and branching.

1. Spikelets ovoid and obtuse, or scarcely pointed.

* Spikelets remarkably flat, and consisting of only two glumes. Stems about 2 feet high, *branched,* and bearing 2, 3, or even 4 panicles, which never more than just protrude out of the sheaths. Leaves and sheaths very rough. Rare waterside plant. 1. LEERSIA.

** Common and elegant woodland plants, with fully-displayed and tremulous panicles; the spikelets little or not at all flattened.

Spikelets reddish-brown, and seldom more than 15. Panicle 3—5 inches long, its branches few, slender, inclining to one side, and often half-pendulous. Stems 15—20 inches high, very numerous, leafy, and slender. 97. SYLVAN MELIC.

Panicle pale-green, the branches in alternate half-whorls, spreading in all directions, and forming a pyramid, the lower ones often bent downwards. Spikelets very numerous. Stems 2 feet high. 2. SYLVAN MILLET-GRASS.

(Spikelets panicled and individually *one-flowered.* Stamens three.)

2. Spikelets lanceolate and very pointed.

* A conspicuous tuft of long silky hairs inside the lower glumes and below the flower. Glumelles with a fine short awn. Panicle long, large and handsome. Spikelets numerous.

† Tuft of hairs longer than the glumelle.

a. Panicle narrow and crowded, 3—12 inches long, often purplish. Stems stout, 3—4 feet high. 33. Common Wood-reed.

b. Panicle loose, 5—6 inches long, often shining purple. Stems 2—3 feet high, more slender than in *a.* 34. Small Wood-reed.

†† Tuft of hairs shorter than the glumelle. Panicle very narrow, 4—6 inches long. Stem 18—36 inches high. 35. Delamere Wood-reed.

** Interior hairs, if any, not conspicuous.

† No awns. Panicle 3—6 inches long, lobed, pointed, a little spreading at the base, whitish, or tinged with red, especially on one side. Stems 3—6 feet high, stout and strong. Leaves long, broad, and densely-tufted. Common waterside perennial. 12. Ribbon-grass.

†† Awns usually to both of the glumes and to the lower glumelle also. Stems decumbent, 12—15 inches high, sometimes very much taller. Panicle lobed, purplish, and shining. Rare salt-marsh plant. 25. Perennial Beard-grass.

††† Awns (often very small) to the glumelles only, or none.

‡ Lower glumes swollen at the base. Panicle lobed, very close, tapering, bristly, and shining. Stems 6—15 inches high. 31. Gastridium.

‡‡ Lower glumes not swollen at base. Panicle much branched; the flowers minute, innumerable, solitary, and erect.

‖ Awns 2—4 times as long as the spikelets, which are very shining. Stems 2—3 feet high. 30. Silky Bent-grass.

‖‖ Awns less than twice as long as the spikelets, and sometimes absent. *Leaves flat.* Stems 3—12—24 inches high.

a. Glumelles awnless, or nearly so.

Panicle brown. Ligule minute and truncate. 26. Common Bent-grass.

Panicle whitish. Ligule acute and conspicuous. 27. White Bent-grass.

b. Glumelle shortly awned from below the middle. Panicle rather close. Stems decumbent. 28. Small Bent grass.

‖‖‖ Awns as in ‖‖. *Leaves bristle-like.* Stems 8—12 inches high. 29. Bristle Bent-grass.

** Awns terminal or very nearly

1. Awns inconsiderable. I
   Flower-stems 4—10 ir
   lateral and rather clos

2. **Awns inconsiderable.**
   irregular.

   Spikelets 3—5-flo
   or two long h
   branches clos
   dull-green, rc

   Spikelets 5—10-
   branched and
   cylindrical. S

3. **Awns conspicuous. Pani**
   stems 6—12 inches hi

   Flowers monandr
   manifest.

   Lower glume redı
   2—3 inches l

4. **Awns conspicuous. Pa**
   the lower spikelet flow
   high. Rare annual w

5. **Awns conspicuous. Pa**
   starved), the spikelets

   † Glumelles oblo
   drooping to

(Spikelets panicled, individually two or more flowered, long, and pendulous. Glumelles all conspicuously awned; the awn *terminal* or nearly so.)

b. Ovary hairy.

Leaf-sheaths with long hairs; stems 5—6 feet high; awns shorter than the glumes.

64. Rough Drooping Brome-grass.

Leaves softly downy or glabrous; awns much longer than the glumes; stems two feet high.

65. Hedge Drooping Brome-grass.

‡‡ Panicle compact and erect.

a. Leaf-sheaths with long hairs. Stems 18 inches high. Anthers orange-coloured. 63. Upright Perennial Brome-grass.

b. Leaves softly downy or glabrous.

From base of spikelet to tip of awn, less than two inches.

67. Upright Annual Brome-grass.

Measure of same parts more than three inches.

66. Jersey Brome-grass.

∴ Awn springing from below the centre of the glumelle.

† Spikelets 2-flowered.

‡ Awn sharply-bent and much protruded. Panicle silver-gray, 4—8 inches long, inclining to one side. Stems 3 feet high.

44. Silver Oat-grass.

‡‡ Awn only slightly or not at all protruded.

a. Panicle very loose, with hair-like and spreading branches; the spikelets silvery-gray or silvery-purplish, and beautifully shining.

Stems 2—4 feet high. Panicle very large, pyramidal, symmetrical, and with rough branches. Leaves flat, hard, and very rough. Plant growing in great cushion-like tufts. Awns quite concealed. Perennial. 36. Tufted Hair-grass.

Stems numerous, 12—18 inches high. Branches of the silver-gray panicle crisped and wavy. Leaves long and very numerous, their margins involute. Awns projecting. Perennial.

37. Heath Hair-grass.

Stems 4—12 inches high. Leaves few and short. Panicle with three branchlets from every point of subdivision. Awns projecting. Annual.

39. Silvery Hair-grass.

b. Panicle dense, narrow, and spike-like, or at least while young. Stems 3—6 inches high.

Awns hair-like, slightly projecting. Panicle scarcely an inch long. Annual. 38. Vernal Hair-grass.

Awns not projecting, jointed in the middle, the joint hairy, the part below it twisted, and the upper portion thickened. Panicle 1—2 inches long.

40. Gray Hair-grass.

Spikelets mc
few, thc

B. **Spikelets with one awnless bisex**
*** Awnless bisexual flower te**
irregular, 4—6 inches lon
Plant coarse, 1—2 feet hi
**** Awnless flower the lowest.**
† Panicles silvery and gl
side. Awns sharply t

†† Panicle without lustre,
so. Plant more or le
Whole plant ver
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Joints of the ste
Lower glum
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Sl

Spikelets panicled as in Section V.
wholly destitute of awns.
A. Spikelets *sessile.*
Panicle 2—6 inches long, ver

(Spikelets panicled, individually two or more flowered, awnless, and more or less stalked. Glumes concealing the flowers.)

b. Lower glumes very acute. Spikelets green, generally about six, in a contracted panicle 1—1½ inch long. Flower-stems 6—8 inches high. Plant stiff, harsh, and decumbent. 99. TRIODIA.

c. Glumes and glumelles all acute. Spikelets ovoid, shining brown. Panicle spreading. Root creeping. Stem 9—18 inches high. 9. NORTHERN HOLY-GRASS.

c. Spikelets more or less *stalked;* and the lower glumes *shorter* than the flowers, thus *not concealing them.*

* Lower glume very small. Upper one large, and, as well as the glumelles, *truncate and conspicuously ragged at the extremity.* Spikelets 2-flowered. Panicle spreading, dark brownish-purple. Plant weak and flaccid, 6—20 inches high, semi-aquatic. Leaves broad and short, with an abrupt point resembling that of a Roman sword. 95. CATABROSA.

** Glumes not truncate. Spikelets three or more flowered.

† Spikelets ovoid or broadly triangular, flattened, and tremulous, owing to the slenderness of their stalks. Panicle very open. Stems 6—12—18 inches high. Leaves few and short.

Perennial. Spikelets brown and purple. Flowers 6—8 in every spikelet. 78. COMMON QUAKING-GRASS.

Annual. Spikelets smaller and green. 79. GREEN QUAKING-GRASS.

†† Spikelets oblong or linear. Fresh-water *aquatic plants.*

Panicle fine brown, large and spreading, 5—6 inches in diameter at the base, obtuse at the top. Stems 3—6 feet high. 80. GREAT WATER POA.

Panicle silvery-green, partly decumbent on the surface of the water, rising 12—18 inches above it, very slender, and while young, branching irregularly. Spikelets very long and slender, cylindrical and appressed. Many of the leaves floating. 81. FLOATING POA.

††† Spikelets oblong or linear. Plants *not aquatic.*

1. Moorland plant. Panicle 2—8 inches long, dark greenish-purple or dull violet, rarely green, the branches close and erect. Stems 1—2 feet high, with only one visible knot and that near the base. Anthers and stigmas reddish-purple. Herbage hard and coarse. 96. PURPLE MOOR-GRASS.

2. *Plant annual.*

a. Plant 1—10 inches high, light green, *limp and succulent,* the leaves crimped here and there along one of the margins. Glumelles *keeled.* 87. COMMON WAYSIDE POA.

(Spikelets panicled, individually three or more flowered, awnless, sessile, and oblong or linear. Glumes not truncate. Plant annual and not aquatic.)

b. Plant 6—8 inches high, hard and stiff. Glumelles rounded at the back. Branches of the panicle 2-ranked. Spikelets unilateral.

Spikelets 3—4-flowered. Plant glaucous. 83. PROCUMBENT SEASIDE POA.

Spikelets six or more flowered. Plant eventually brownish or purplish. 85. HARD WAYSIDE POA.

3. Plant perennial. *Panicle spreading*, not ovoid. *Glumelles keeled.*

a. Common meadow-plants 1—2 feet high. Spikelets numerous.

Root-stock creeping. Stem and leaves smooth. Panicles 2—3 inches long. Ligule short and obtuse. 89. SMOOTH MEADOW-GRASS.

Not creeping. Stem and leaves roughish. Panicle slender, often 6 inches long. Ligule lanceolate. 90. ROUGHISH MEADOW-GRASS.

b. Rare alpine plant, 6—12 inches high. Spikelets 1—3 on each branch. Panicle zigzag. Ligule lanceolate. 92. WAVY POA.

4. Perennial. Leaves *involute-subulate*, densely tufted. Stems 4—10 inches high. Panicle 1½—3 inches long, unilateral, and rather close. Glumelles rounded and pointed. 70. SHEEP'S FESCUE.

5. Perennial. Leaf-sheaths and lower and upper part of stem *remarkably flattened*. Stem creeping at base, 6—18 inches high. Plant glaucous. 88. FLAT-STALKED POA.

6. Glumelles rounded at the back, and very pointed, or almost with short awns. Leaves flat.

Spikelets 3—5-flowered. Panicle rather compact, 4—6 inches long; plant tall and reed-like. 72. WOODLAND FESCUE.

Spikelets 5—10-flowered. 71. MEADOW FESCUE.

7. Glumelles rounded at the back, obtuse or not very pointed. Panicle rather loose, 4—6 inches long. Stem 6—18 inches high. Spikelets unilateral.

Stem creeping at base. Panicle stiff. 82. COMMON SEASIDE POA.

Stems tufted. Panicle very spreading, especially at the base. 84. SLENDER SEASIDE POA.

8. Glumelles keeled.

a. Panicle usually very long. Stems 1—2 feet high. Spikelets 2—5-flowered, the flowers not connected by a web. Plant slender and delicate. 91. SYLVAN POA.

b. Panicle ovoid. Stems more or less bulbous at the base.

Panicle contracted. Flowers connected by a web. 94. BULBOUS POA.

Panicle rather spreading. No web to the flowers. 93. ALPINE POA.

SECTION VII.

Panicle simple, erect, consisting of 6—7 flowers, with awns 12—15 inches long, and feathered for their whole extent, the whole resembling the tail of a Bird-of-Paradise. Stems numerous, 12 inches high. Leaves numerous. 103. FEATHER-GRASS.

HABITATS AND DISTRIBUTION.

1. Leersia—*Leers'ia oryzoi'des.*

Muddy river-banks, among reeds, &c.; borders of ditches, margins of mill-ponds, mingling with other aquatic grasses, and in similar wet and crowded habitats. Rare, and hitherto noticed only in Surrey, Sussex, and Hampshire. Abundant by the river Mole, at Brockham Green. Fl. August, September.

E. B. Supp. iv. 2908.

This curious grass, observed to be British only in 1844, bears a striking resemblance to the awnless variety of the common rice-plant. The panicle, which in the south of Europe, is completely exposed, in England remains almost entirely concealed within the sheath, and to this clandestine mode of flowering may no doubt be ascribed its non-discovery at an earlier date. In the extreme asperity of the leaves, and of the lower internodes, and in its bearing 2, 3, or even 4 panicles on the same stem, the Leersia differs from every other indigenous grass.

2. Sylvan Millet-grass—*Mil'ium effu'sum.*

Woods and shady cloughs, loving the green gloom of dense leafage; common. Fl. May, June.

Curtis, ii. 229; E. B. xvi. 1106; Baxter, iv. 247.

An exceedingly elegant grass, flowering along with the rose lychnis and the yellow dead-nettle, and still beautiful when the wild raspberries ripen in August. The lower branches of the panicle are by that time much deflexed.

3. Common Finger-grass—*Digita'ria sanguina'lis.*

Dry sandy fields; rare, only found in the south of England, and probably introduced casually as a weed of cultivation. Occasionally as a weed in gardens. Fl. June—August. Annual.

Curtis, ii. 224; E. B. xii. 849 (both as *Pan'icum sanguina'le)*; Baxter, v. 332.

4. Glabrous Finger-grass—*Digita'ria humifu'sa.*

Dry fields and sandy places; rare, and like the preceding, found only in the south. Fl. July, August. Annual.

E. B. Supp. i. 2613.

5. Green Bristle-grass—*Seta'ria vir'idis.*

Sandy fields; rare, and chiefly in the south of England. Fl. summer and autumn. Annual.

Curtis, ii. 222; E. B. xiii. 875 (both as *Pan'icum vir'ide.*)

6. Glaucous Bristle-grass—*Seta'ria glau'ca.*

Dry fields in the south of England; very rare. Fl. July, August. Annual.

7. Whorled Bristle-grass—*Seta'ria verticilla'ta.*

Moist cultivated fields; occasionally found in the south of England. Fl. July, August. Annual.

Curtis, ii. 223; E. B. xiii. 874 (both as *Pan'icum verticilla'tum*); Baxter, iii, 211.

8. COCKSPUR-GRASS—*Echinochlo'a Crus-gal'li.*

Moist arable land in the south of England, as a weed; occasionally. Fl. July—September. Annual.

Curtis, ii. 225; E. B. xiii. 876; Baxter, vi. 462 (all as *Pan'icum Crus-gal'li.)*

9. NORTHERN HOLY-GRASS—*Hierochlo'e borea'lis.*

Valleys in the Scotch Highlands; extremely rare. Near Thurso, Caithness. Fl. end of May and beginning of June.

E. B. Supp. i. 2641; Baxter, ii. 148.

Probably not so rare as it appears, botanists usually making their visits to these localities when the flowering is over, and the leaves only remain in view.

10. SWEET-SCENTED VERNAL-GRASS—*Anthoxan'thum odora'tum.*

Everywhere in meadows and pastures, and on hedgebanks; growing in every kind of soil, from the poorest and driest to the most fertile, but preferring that which is somewhat moist. Fl. April—July; full-blown in the middle of May.

Curtis, i. 4; E. B. ix. 647; Baxter, ii. 99.

The earliest of the hay-grasses to show its spikes of bloom, and reputed the chief source of the perfume of the newly-mown meadows. Few of the family are more variable in luxuriance, nor is there any contrast greater than that of an early specimen from a dried-up field, and a fully-opened panicle such as may be found in moist rich land, or in a wood, towards midsummer. But it may always be told by its possessing only two stamens, a condition not occurring in any other British grass.

11. CANARY-GRASS—*Phal'aris Canarien'sis.*

Occasionally in cultivated land and on manure heaps, being grown for birds, and common in gardens as an ornamental plant, and the seeds carried out with the refuse. Fl. summer. Annual.

E. B. xix. 1310; Baxter, i. 56.

The spikes of this grass are singularly beautiful, by reason of the broad green stripes upon the glumes. In gardens they are often as long as one's little finger. The small polished yellow fruits are the "canary-seed" given to cage-birds.

12. RIBBON-GRASS—*Digra'phis arundina'cea.*

Ditches, and by pond and river sides; common everywhere, and generally in great plenty. Fl. June, July.

E. B. vi. 402 (as *Phal'aris arundina'cea.)*

The large and bushy plant with green and white-striped leaves, everywhere cultivated in gardens under the name of "French-grass" and "Ribbon-grass," is a variety of this.

13. MEADOW CAT'S-TAIL—*Phle'um praten'se.*

Everywhere on the borders of fields, and especially near corn, but seldom among scythe-grass. Fl. when the hay-making is pretty well over, and most luxuriantly in autumn.

E. B. xv. 1076; Baxter, i. 68.

14. Alpine Phleum—*Phle'um alpi'num.*

Mountains in the Highlands of Scotland. Moist grassy banks above the falls of Craig Wharral, Clova. Fl. summer.

E. B. viii. 519.

15. Sandhills Cat's-tail—*Phle'um arena'rium.*

Sandy sea-coasts. In England and Ireland very abundant; in Scotland rare. Sometimes inland, as on rabbit-heaths near Mildenhall, Suffolk. Fl. summer. Annual.

Curtis, iii. 448; E. B. iv. 222 (as *Phal'aris arena'ria.*)

16. Bœhmer's Phleum—*Phle'um Bœh'meri.*

Dry fields and waste places; very rare, and perhaps confined to the eastern counties. Chalk-pits and heaths at Eriswell, Suffolk. Fl. summer.

E. B. vii. 459 (as *Phal'aris phleoi'des.*)

17. Rough Phleum—*Phle'um as'perum.*

Dry waste places; extremely rare. Formerly found in Cambridgeshire. Now extinct? Fl. summer. Annual.

E. B. xv. 1077 (as *Phle'um panicula'tum.*)

18. Meadow Fox-tail—*Alopecu'rus praten'sis.*

Meadows and pastures, everywhere; one of the earliest and most conspicuous grasses of the hay-field. Fl. May, June.

Curtis, ii. 297; E. B. xi. 759; Baxter, i. 45.

In different individuals, and at different periods of growth, the anthers are either buff-coloured or purple, making it appear, at first sight, as if there were two species.

19. Cornfield Fox-tail—*Alopecu'rus agres'tis.*

As a weed among corn, Italian rye-grass, and other farm-crops. In the south of England common; elsewhere infrequent, and in Ireland not found. Fl. June, July. Annual.

Curtis, i. 79 (as *Alopecu'rus myosuroi'des*); E. B. xii. 848.

In Cheshire considered indicative of poor soil, and locally called "Hunger-weed."

20. Marsh Fox-tail—*Alopecu'rus genicula'tus.*

Everywhere by the sides of ponds, and in low, wet, marshy places. Fl. June, July.

Curtis, ii. 298; E. B. xviii. 1250.

A variety with extremely short awns, and the anthers more uniformly orange-coloured, has been distinguished as *Alopecu'rus ful'vus* (E. B. xxi. 1467.) Another, found chiefly near the sea, in muddy salt-marshes, with the base of the stem thickened so as to resemble a bulb, has been called *Alopecu'rus bulbo'sus* (E. B. xviii. 1249.)

21. ALPINE FOX-TAIL—*Alopecu'rus alpi'nus.*

Lofty mountains in the Scotch Highlands. Fine and abundant on wet rocks in various places about Clova, especially above the falls of Craig Wharral. Fl. summer.

E. B. xvi. 1126.

22. KNAPPIA—*Knap'pia agrostidé'a.*

Dry waste places, extremely rare, and in Britain only near the sea. Anglesea. Channel Islands. Fl. May, June. Annual.

Curtis, iii. 447; E. B. xvi. 1127; Baxter, iii. 184.

23. HARE'S-TAIL GRASS—*Lagu'rus ova'tus.*

Sandy places near the sea, but as regards Britain, only in the Channel Islands. In Guernsey, abundant near Cobo and Vazon. Fl. June. Annual.

E. B. xix. 1334; Baxter, iv. 256.

A favourite grass for flower-gardens, and inestimable for winter parlour-ornament.

24. MONTPELIER BEARD-GRASS—*Polypo'gon Monspelien'sis.*

Marshy waste places near the sea. Rare, and only found in the south-eastern counties of England. Hampshire. Portsea Island, plentiful. Woolwich. Fl. summer. Annual.

E. B. xxiv. 1704 (as *Agros'tis panice'a*); Baxter, iii. 208.

25. PERENNIAL BEARD-GRASS—*Polypo'gon littora'lis.*

Salt-marshes, brackish and salt-water swamps, pools, and ditches; very rare, and found only in a few places between Norfolk and Hampshire inclusive. Profusely with the *Monspelien'sis* (its usual companion), near Porchester, Hampshire. Fl. summer.

E. B. xviii. 1251 (as *Agros'tis littora'lis.*)

26. COMMON BENT-GRASS—*Agros'tis vulga'ris.*

Everywhere in meadows and pastures, and on dry banks, and a great ornament to the borders of corn-fields at harvest time. Fl. June—Aug.

E. B. xxiv. 1671.

Fields abounding in Bent-grass are remarkably soft and pleasant to walk upon, but farmers find their value inconsiderable.

27. WHITE BENT-GRASS—*Agros'tis al'ba.*

In similar situations, but where the ground is somewhat moist. Often very fine in the trenches cut for draining fields. Fl. summer.

E. B. xvii. 1189; Baxter, vi. 492.

A variety with long, prostrate, and creeping stems, was formerly called *Agros'tis stolonif'era* (E. B. xxii. 1532.) A second, 3 feet high, is common in corn-fields. All these plants, as well as the "*Agros'tis pu'mila*," which is only 2—3 inches high, are probably identical with the *Agros'tis vulga'ris*.

28. Small Bent-grass—*Agros'tis cani'na.*

Moist heaths and moors, and on the borders of ponds and ditches; common. Fl. June, July.

E. B. xxv. 1856.

Probably not distinct as a species from the *Agros'tis vulga'ris.*

29. Bristle Bent-grass—*Agros'tis seta'cea.*

Dry heaths in the south-west and south of England; rare. Fl. summer.

Curtis, ii. 376; E. B. xvii. 1188.

30. Silky Bent-grass—*Agros'tis Spica-ven'ti.*

Dry fields; rare, and only found in the south-eastern and eastern counties. Principally in north-west Surrey. Fl. July. Annual.

E. B. xiv. 951.

Agros'tis or *Ape'ra interrup'ta* (E. B. Supp. iv. 2951.) differs only in having the panicle very narrow, owing to the nearly erect position of the branches, and the spikelets much crowded.

31. Gastridium—*Gastrid'ium lendig'erum.*

Dry fields, woods, and waste places in the south of England; rare. Woods near Breinton, Herefordshire, overlooking the Wye, plentiful. Fl. summer.

E. B. xvi. 1107 (as *Mil'ium lendig'erum*); Baxter, vi. 444.

32. Sea Mat-grass—*Ammoph'ila arundina'cea.*

Seaside sandhills; everywhere, and in great abundance. Fl. summer.

Curtis, iv. 585; E. B. viii. 520 (as *Arun'do arena'ria*); Baxter, vi. 408.

Familiar to every lover of the solitudes and wild beauty of the seaside sandhills, with their ever-changing mountains and valleys, the general mass of which it largely helps to bind together. When the breeze from the water is playing gently, and bending the tips of the leaves lightly, so that they just catch the level surface, the sand becomes marked with semi-circles, and almost perfect circles, many often concentric, one within the other, often also with S and figure 8 patterns, that seem as if wrought by some mathematician. The point of the leaf, as it sweeps over the surface, cuts no deeper than the thickness of a single grain; gradually, however, this produces a smooth deep furrow, the contents of which waft away atom by atom.

33. Common Wood-reed—*Calamagros'tis Epige'jos.*

Moist woods and thickets; widely diffused, but not very common, and in Scotland rather rare. Fine and abundant in Gloddaeth woods, Carnarvonshire. Fl. July, August.

E. B, vi. 403 (as *Arun'do Epige'jos*); Baxter, vi. 412.

34. Small Wood-reed—*Calamagros'tis lanceola'ta.*

Moist woods and cloughs; rare, though widely distributed. Not found in either Scotland or Ireland. Fl. July, August.

E. B. xxx. 2159 (as *Arun'do Calamagros'tis.*)

35. DELAMERE WOOD-REED—*Calamagros'tis stric'ta.*

Marshes near the "Abbey Arms," on the borders of Oakmere, Delamere Forest, Cheshire. Found also in Ireland. Fl. summer.

E. B. xxx. 2160.

36. TUFTED HAIR-GRASS—*Ai'ra cœspito'sa.*

Damp, waste ground; low, wet meadows; pondsides, and in the recesses of moist woods; abundant everywhere. Fl. July, August.

E. B. xxi. 1453.

A large, tall grass of remarkable beauty, and, while young, shining like silver, but hurtful rather than useful to the farmer. *Aira alpi'na* or *lœviga'ta*, (E. B. xxx. 2102.) is an alpine variety of smaller stature, and with shorter leaves, but larger glumes.

37. HEATH HAIR-GRASS—*Ai'ra flexuo'sa.*

Heaths, moors, and dry woods, growing in great tufts; abundant everywhere. Fl. June, July.

E. B. xxii. 1519.

38. VERNAL HAIR-GRASS—*Ai'ra præ'cox.*

Dry waysides and borders of sandy fields; common all over Britain. Fl. May, June. Annual.

Curtis, i. 152; E. B. xviii. 1296.

39. SILVERY HAIR-GRASS—*Ai'ra caryophyl'lea.*

Dry, waste, and sandy places; common, though not quite so frequent as the *præ'cox.* Fl. May, June. Annual.

Curtis, ii. 370; E. B. xii. 812; Baxter, vi. 416.

40. GREY HAIR-GRASS—*Ai'ra canes'cens.*

Sandy places on the coasts of Norfolk and Suffolk, and in the Channel Islands. Fl. June, July.

E. B. xvii. 1190.

41. WILD OAT—*Ave'na fat'ua.*

Clover, turnip, and corn-fields, especially among barley and oats, as a weed; common. Fl. with the corn. Annual.

E. B. xxxi. 2221.

A variety of this plant, called *Ave'na strigo'sa*, (E. B. xviii. 1266.) occurs in similar situations, and particularly on the slopes of railway cuttings. It differs from the ordinary state chiefly in its closer panicle and more divided branches, and in having two short awns besides the long and conspicuous one. The cultivated oat, or *Ave'na sati'va*, is another variety, readily degenerating into the wild state. The latter is distinguished by having one or more of the upper spikelets imperfect and awnless, and by the absence of the interior tuft of fulvous hairs.

42. SHINING OAT-GRASS—*Ave'na praten'sis.*

Meadows and pastures, especially upon elevated ground; widely distributed, but not common. Fl. June, July.

A very beautiful and showy grass, existing in Britain under no less than four different forms, all of which are by some botanists considered species. viz.:—

1. The normal form. Leaves involute, their sheaths glabrous. Spikelets about five-flowered. *Ave'na praten'sis*—E. B. xvii. 1204.
2. Leaves flat. Spikelets about five-flowered. Plant luxuriant, and found mostly upon high mountains. Sometimes, as near Settle, in woods. *Ave'na alpi'na*—E. B. xxx. 2141 (as *Ave'na planicul'mis.*)
3. Characters as in the preceding, but the plant still more luxuriant. *Ave'na planicul'mis*—E. B. Supp. i. 2684.
4. Leaves flat, and, as well as their sheaths, downy. Spikelets rather small, and containing only about three flowers. Pedicels with long hairs. Common in dry pastures and upon hill-sides on chalk and limestone. Ormeshead, abundant. *Ave'na pubes'cens*—E. B. xxiii. 1640; Baxter, iv. 292.

43. Yellow Oat-grass—*Trise'tum flaves'cens.*

Dry meadows, and open breezy downs, bordering patches of heath and furze. In England and Ireland common; in Scotland rather rare. Fl. June, July.

Curtis, i. 150; E. B. xiv. 952 (both as *Ave'na flaves'cens.)*

On clay and sandstone, as about Manchester, the panicles, though glossy, are comparatively-speaking, green. The golden lustre for which this beautiful grass is so remarkable when in perfection, appears to be developed only upon limestone.

44. Silver Oat-grass—*Arrhenathe'rum avena'ceum.*

Everywhere among mowing-grass and upon hedgebanks. Fl. June, and by waysides, again in autumn.

Curtis, i. 151 (as *Ave'na ela'tior*); E. B. xii. 813 (as *Holc'us avena'ceus.)*

45. Meadow Soft-grass—*Holc'us lana'tus.*

Everywhere in meadows and pastures; rarely in woods or where shaded by trees. Fl. all summer.

Curtis, ii. 228; E. B. xvii. 1169; Baxter, i. 64.

Remarkable for the velvety softness of every part, and for the fine purple colour of the panicles while unexpanded. When in full bloom they give a peculiar reddish hue to the surface of meadows where the plant abounds, something like that of sorrel, but neither so vivid nor so elegant. When growing under the shade of trees, the panicles are pale green.

46. Sylvan Soft-grass—*Holc'us mol'lis.*

Woods and shady places; never in the open fields or among mowing-grass. Common, but by no means universal, and in some districts very rare. Fl. July, August.

Curtis, ii. 300; E. B. xvii. 1170.

Remarkable for the woolly joints of the stem, and for the whiteness of the little panicles, which are the only ones of the kind found under trees.

Sparti'na alterniflo'ra (E. B. Su
being more luxuriant, having the le
the glumes nearly glabrous. Plenti
on the Hampshire coast, towards C

49. LEPTURUS

**Salt-marshes, seaside pasture
times upon dry banks a little wa**

E. B. xi. 760; Baxter, vi.

50. WIRE-GI

**Dry moors and heaths; comm
Abundant on all the high hills
with *Junc'us squarro'sus*, to for**

Curtis, iv. 584; E

51. COMMON LYME

**Sandy seashores. Common
the north than in the south.**

E.

**A curious variety in which the
downwards as if broken, has been
xxiii. 1586.) Formerly found on th**

52. SYLVAN BARLEY-

**Woods and thickets. In t
uncommon. Elsewhere unusu
Ireland. Fl. July.**

55. Seaside Barley-grass—*Horde'um marit'imum.*

Muddy and sandy sea-shores, salt-marshes, pastures near the sea, and on the banks of estuaries and tidal rivers. Common, but chiefly in the south, and perhaps not extending into Scotland. Often constituting nearly the whole herbage of flat and saline pastures on the coast of Hampshire. Fl. June—September. Annual.

Curtis, iii. 450; E. B. xvii. 1205.

56. Couch-grass—*Agropy'ron re'pens.*

Cultivated farm-land, and in hedges, everywhere,—a pestilent weed. Fl. July—September.

E. B. xiii. 909; Baxter, ii. 112 (both as *Trit'icum re'pens.*)

57. Sandhills Wheat-grass—*Agropy'ron jun'ceum.*

Seaside sandhills; exceedingly common, and generally mingled with the *Ammoph'ila arena'ria.* Fl. summer.

E. B. xii. 814 (as *Trit'icum jun'ceum.*)

Perhaps only a maritime variety of the *re'pens.*

58. Dogs' Wheat-grass—*Agropy'ron cani'num.*

Shady places, and on the banks of rivers, where there are trees; frequent, but not very common. Fl. July, August.

E. B. xx. 1372 (as *Trit'icum cani'num.*)

59. Common Ray-grass—*Lo'lium peren'ne.*

Everywhere in meadows and pastures, on hedgebanks, and by dry waysides. Fl. all summer.

Curtis, iii. 449; E. B. v. 315; Baxter, ii. 116.

A very variable grass, the racemes of all degrees of tenuity and contraction, and sometimes even branched.

The handsome plant called "Italian ray-grass," (*Lo'lium multiflo'rum*) originally imported from the continent, and much sown on farm-land, whence it has escaped into a seemingly wild condition, coming up half-spontaneously among clover, &c., and in the corners of cornfields, is a variety of the *L. peren'ne*, induced by cultivation abroad. It is distinguished by its greater size, very long awns, and having more flowers in the spikelets. *Lo'lium linic'ola* (E. B. Supp. iv. 2955.) appears to be the same plant in a state of less luxuriance.

60. Darnel—*Lo'lium temulen'tum.*

Cornfields, as a weed; common, but rather local. At Mobberley, in Cheshire, so exceedingly abundant that in a single walk through the fields, a large sheaf may be collected. This is the *awnless* state of the plant, called, by some botanists, "white darnel," or *Lo'lium arven'se.* The country-people thereabouts believe it to be degenerated wheat. Fl. July. Annual.

E. B. xvi. 1124, and xvi. 1125 as *Lo'lium arven'se.*

61. Common False-brome—*Brachypo'dium sylvat'icum.*

Moist shady hedgebanks, and in woods; common everywhere, except in the northern parts of Scotland. Fl. August, September.

E. B. xi. 729 (as *Bro'mus sylvat'icus.*)

62. Pinnate False-brome—*Brachypo'dium pinna'tum.*

Waste and stony fields and uncultivated places. In the middle and north of England, (as in north-west Yorkshire) not uncommon; in the south rather rare, though plentiful where it occurs, and in Scotland and Ireland apparently unknown. Fl. July, August.

E. B. xi. 730 (as *Bro'mus pinna'tus*); Baxter, vi. 448.

63. Upright Perennial Brome-grass—*Bro'mus erec'tus.*

Meadows and waysides; chiefly in the south of England. Near Bristol certain hayfields are largely composed of it. Fl. June.

E. B. vii. 471.

64. Rough Drooping Brome-grass—*Bro'mus as'per.*

Moist woods and cloughs; common, except in the north of Scotland. Fl. summer and autumn. Annual or biennial.

Curtis, i. 80 (as *Bro'mus hirsu'tus*); E. B. xvii. 1172.

65. Hedge Drooping Brome-grass—*Bro'mus ste'rilis.*

Dry hedgebanks and along waysides; common, except in the north of Scotland. Fl. summer and autumn. Annual or biennial.

Curtis, i. 9; E. B. xv. 1030.

Called "*sterilis,*" not because unproductive of seeds, but by reason of its uselessness to cattle.

66. Jersey Brome-grass—*Bro'mus max'imus.*

Dry banks. Jersey. Near Clonmel, Ireland. Fl. summer.

E. B. Supp. iii. 2820.

67. Upright Annual Brome-grass—*Bro'mus dian'drus.*

Waste places and waysides, chiefly upon limestone, and only in the southern counties of England. St. Vincent's Rocks, near Bristol. Fl. May, June. Annual.

Curtis, ii. 369; E. B. xiv. 1006.

68. Common Meadow Brome-grass—*Bro'mus mol'lis.*

Everywhere in meadows and pastures, and by waysides. Fl. the whole season, but especially in spring and early summer. Annual and biennial.

Curtis, i. 8; E. B. xv. 1078; Baxter, v. 348.

The Proteus of English grasses, well named by Scopoli *polymor'phus*, and presenting itself under the following principal forms.

The ordinary one, constituting the genuine *Bro'mus mol'lis* of authors; an extremely common plant, with a nearly erect panicle, which is either short and compact, or long and slender, and is in every part softly downy

"*Bro'mus commuta'tus*," distinguished by its rather glossy, gray-green spikelets, acquiring, in sunny spots, a brownish tinge, and by its having longer and harsher peduncles than those of the ordinary *mol'lis*, while the panicle, instead of a strong tendency to the erect position, is rather disposed to droop. This appears to be the plant figured in E. B. xiii. 920 as *B. praten'sis*.

Next there is the form figured in E. B. xv. 1054, as *Bro'mus racemo'sus*, a plant resembling the common *mol'lis*, except that it is nearly glabrous. On the borders of fields, and farm-land generally, not very uncommon.

Fourthly, there is a tall, corn-field variety, growing 2—3 feet high, with a loose, more or less drooping and hairy panicle, easily distinguished when in fruit, by the separately rolled-up flowers. In Cheshire the country-people call it "drook," and believe it to be oats degenerated. E. B. xvii. 1171, as *Bro'mus secali'nus*.

Lastly there is a depauperated condition of the plant, very common in dry fields and on poor clay land, in which the panicle is reduced to a single spikelet, which is usually erect. No name has been given to this one, though in appearance quite as distinct as any of the others.

69. GIANT DROOPING BROME-GRASS—*Bro'mus gigan'teus.*

Woods, groves, thickets, and shady hedge-banks; tolerably common, except in Scotland. Fl. August, September.

Curtis, ii. 299; E. B. xxvi. 1820 (as *Festu'ca gigan'tea).*

Easily distinguished among the late-flowering grasses by its immense and elegantly drooping and slender panicle, towering among the ferns 4—6 feet above the ground. The only grass resembling it is the *Bro'mus as'per*, from which it is known by the smoothness of the sheaths of the leaves (those of the *as'per* being hairy), and infallibly by the two brown auricles at the base of the lamina.

Festu'ca triflo'ra (E. B. xxvii. 1918) is the same plant when of smaller stature, paler, and more slender.

70. SHEEP'S FESCUE-GRASS—*Festu'ca ovi'na.*

Heaths, moors, and hilly pastures, especially where dry and open; common everywhere. Fl. June, July.

E. B. ix. 585, and xxvii. 1917 (as *Festu'ca cæ'sia).*

When growing in low, moist meadows, or where shaded by trees, the whole plant becomes larger and more luxuriant, and the slender, hair-like, densely-tufted leaves found on the hill-side are exchanged for nearly flat ones, at least upon the stem. Under this aspect it is often distinguished as a species, and called the "hard fescue," or *Festu'ca durius'cula* (E. B. vii. 470). In very dry places, especially in sandy spots near the sea, it assumes, on the other hand, a remarkably creeping character, the subterranean stems often reaching to a length of many feet, or even yards. It is then distinguished by some as *Festu'ca ru'bra*, (E. B. xxix. 2056.) and *Festu'ca sabulic'ola*. A third state of the plant is viviparous *(F. vivipa'ra*, E. B. xix. 1355.) Cultivated in gardens, this last variety becomes permanent and very luxuriant, the clusters of young plants being two inches or more in length and breadth, and by their weight bowing the stem archways down to the ground, where many take root, and form a miniature banyan-tree.

71. Meadow Fescue—*Festu'ca praten'sis.*

Moist meadows and pastures; common everywhere. Fl. June, July.

Curtis, ii. 371; E. B. xxiii. 1592; Baxter, v. 324.

One of the most valuable of our meadow-grasses, and like the *Bro'mus mol'lis*, exceedingly variable. In the normal condition the panicle is nearly erect, and branched, but rather close, the spikelets flat, linear, and obtuse. This is the form commonly found in hay-fields. When growing on the banks of rivers and in other wet places, it becomes taller and often reed-like, and has a longer and more branched and spreading panicle, along with broader leaves. In this state it is the "tall fescue" or *Festu'ca ela'tior* of Curtis, ii. 372, and of E. B. xxiii. 1593. Though frequent, the *ela'tior* is by no means so plentiful as the normal form; it differs also in blossoming much later, and is usually finest in August and September. In similar situations again, especially where the soil is rich, the spikelets are often almost sessile, so as to convert the panicle into a large and nearly simple raceme, much resembling that of the *Lo'lium peren'ne.* This variety has been called "ray-fescue" or *Festu'ca lolia'cea* (Curtis, ii. 373; E. B. xxvi. 1821.)

72. Woodland Fescue—*Festu'ca sylvat'ica.*

Mountainous woods, chiefly in the north of England. Found also in Ireland and the south of Scotland. Fl. summer.

E. B. xiv. 1005 (as *Festu'ca calama'ria.*)

Festu'ca decid'ua (E. B. xxxii. 2266.) differs only in being a smaller plant, with narrower leaves, and fewer flowers in the spikelets.

73. Road-side Fescue—*Festu'ca bromoi'des.*

Dry waysides, old quarries, and upon walls; common, except in Scotland. Fl. June—August. Annual.

E. B. xx. 1411.

A state of this plant with a much shorter panicle than usual, and the upper glumes nearly as long as the awns, was formerly distinguished as *Festu'ca Myu'rus* (E. B. xx. 1412).

74. Sandhills Fescue—*Festu'ca uniglu'mis.*

Seaside sandhills. On the coasts of south-eastern, southern and western England, and in Ireland, not uncommon. Southport, Lancashire, very plentiful. Fl. June. Annual.

E. B. xx. 1430.

75. Rough Cock's-foot Grass—*Dac'tylis glomera'ta.*

Everywhere in meadows and pastures and by waysides. Fl. summer and autumn. Often fine in October.

E. B. v. 335; Baxter, ii. 108.

76. Crested Dog's-tail—*Cynosu'rus crista'tus.*

Everywhere in meadows and pastures where tolerably dry. Fl. June, rather late compared with the other hay-grasses.

E. B. v. 316; Baxter, iii. 216.

A grass of remarkably beautiful structure, the flowers all looking one way, and the spikelets resembling little combs.

77. Hedgehog-grass—*Cynosu'rus echina'tus.*

Occasionally as an introduced weed in corn-fields, Italian ray-grass fields, and near the coast, upon ballast-heaps. Fl. June. Annual.

E. B. xix. 1333.

78. Common Quaking-grass—*Bri'za me'dia.*

Meadows and pastures; everywhere, except in the north of Scotland. Fl. June.

E. B. v. 340; Baxter, ii. 104.

The most graceful and delicate of the British grasses, the shining green and purple spikelets, which are triangular and compressed, and resemble little rattlesnakes' tails, hung on such slender stalks that they quiver with the slightest touch or breath of air.

79. Green Quaking-grass—*Bri'za mi'nor.*

Dry waste places in the extreme south and south-west of England. Abundant and very luxuriant on the rich and cultivated soils about Penzance. In the neighbourhood of Kelston, growing among wheat and barley, which it frequently overtops. Fl. May, June. Annual.

E. B. xix. 1316.

80. Great Water Poa—*Poa aquat'ica.*

Sides of ponds, ditches, and water in general; common, except in Scotland. Fl. July.

Curtis, ii. 304; E. B. xix. 1315.

81. Floating Poa—*Poa flu'itans.*

Everywhere in ditches and slow streams, and on the margins of ponds. Fl. summer.

Curtis, i. vii. (as *Festu'ca flu'itans*); E. B. xxii. 1520.

Easily identified by the leaves floating flat upon the surface of the water, and by the tall, very slim, green and silver panicles, which at first do not open their branches, or only in a very irregular manner. Eventually the lowermost ones project almost at right angles.

Along with several other Poas, this grass is by some botanists called *Glyce'ria*, and divided into two species. The E. B. figure represents the form called *Glyce'ria plica'ta*, said to be distinguished by its glaucous herbage, and by having flatter and blunter leaves, shorter lower glumes, and shorter anthers than occur in the true *flu'itans.*

82. Common Seaside Poa—*Poa marit'ima.*

Seacoasts, and on the banks of tidal rivers; common. Fl. summer.

E. B. xvi. 1140.

83. Procumbent Seaside Poa—*Poa procum'bens.*

Waste ground near the sea; not uncommon, except in Scotland, where it is scarcely known. Fl. summer. Annual.

Curtis, ii. 375; E. B. viii. 532.

84. Slender Seaside Poa—*Poa dis'tans.*

In habitats and distribution similar to the *marit'ima*, but not extending to the north of Scotland. Fl. summer.

Curtis, ii. 374 (as *Poa retroflex'a)*; E. B. xiv. 986.

Considered by some botanists to constitute, along with several other Poas, a genus which they distinguish under the name of *Sclerochlo'a.* Hence the "*Sclerochlo'a Bor'reri*" of E. B. Supp. iii. 2797, which differs from this very unimportantly.

85. Hard Wayside Poa—*Poa rig'ida.*

Roadsides, dry walls, dry and earthy cliffs, and other dry waste places. In the south of England and in Ireland, common; in the north never met with. Fl. summer. Annual.

Curtis, i. 76; E. B. xx. 1371.

86. Dwarf Seaside Poa—*Poa lolia'cea.*

Dry waste places near the sea; rather rare, especially in Scotland. Fl. summer.

E. B. iv. 221 (as *Trit'icum lolia'ceum.*)

87. Common Wayside Poa—*Poa an'nua.*

Waysides, cultivated land, disused garden-walks, and among the stones in untravelled streets, the customary companion of chickweed and groundsel, and, like them, in blossom always. Annual.

Curtis, i. 6; E. B. xvi. 1141; Baxter, iv. 288.

Immediately distinguished from its congeners by the leaves being crisped here and there, a character well marking the species, though not peculiar to the genus.

88. Flat-stalked Poa—*Poa compres'sa.*

Dry waste places, and upon walls; common as far as the south of Scotland. Fl. all summer.

E. B. vi. 365.

89. Smooth Meadow-grass—*Poa praten'sis.*

Everywhere in meadows and pastures and on hedge-banks, preferring dry ground. Fl. spring and summer, commencing early.

Curtis, i. 77; E. B. xv. 1073; and xiv. 1004 (as *Poa sub-cœru'lea.)*

90. Roughish Meadow-grass—*Poa trivia'lis.*

In similar situations, but giving the preference to *moist* ground; equally general, and flowering at the same seasons.

Curtis, i. 78; E. B. xv. 1072.

91. Sylvan Poa—*Poa nemora'lis.*

Woods, shady places, and ravines among lofty mountains; common. Fl. June, July.

E. B. xii. 1265.

A very variable grass, several forms of which have received specific names, as *Poa cæ'sia*, (E. B. xxiv. 1719.) *Poa glau'ca*, (xxiv. 1720.) *Poa Parnel'lii*, (Supp. iv. 2916.) Poa Balfour'ii, (Supp. iv. 2918.) and *Poa monta'na.*

92. WAVY POA—*Poa lax'a.*

Ben Nevis and Loch-na-gar, Scotland; the only British localities, and there usually viviparous. Fl. summer.

E. B. xvi. 1123 (as *Poa flexuo'sa.*)

93. ALPINE POA—*Poa alpi'na.*

Lofty mountains in the north of England, Scotland, and Ireland; common, and frequently viviparous. Fl. summer.

E. B. xiv. 103.

94. BULBOUS POA—*Poa bulbo'sa.*

Dry waste places near the sea; rare, and only found in the south and south-east of England. Alum Bay, Isle of Wight. Fl. May.

E. B. xv. 1071.

95. CATABROSA—*Catabro'sa aquat'ica.*

Ditches and pondsides; rather unusual, though widely distributed. Cheshire, towards Manchester, very common. Fl. May, June.

Curtis, i. v.; E. B. xxii. 1557 (both as *Aira aquat'ica*); Baxter, iv. 252.

96. PURPLE MOOR-GRASS—*Molin'ia cæru'lea.*

Heaths, peaty moors, and in woods; common. Fl. June, July.

Curtis, ii. 303; E. B. xi. 750 (both as *Mel'ica cæru'lea.*)

97. SYLVAN MELIC—*Mel'ica uniflo'ra.*

Damp shady woods and cloughs; growing in dense tufts; very common, except in Scotland, where it is local and rare. Fl. May, June.

Curtis, ii. 302; E. B. xv. 1058.

98. MOUNTAIN MELIC—*Mel'ica nu'tans.*

Shady and rocky places, principally in the mountainous districts of the north of England and the south of Scotland. Fl. May, June.

Curtis, ii. 368; E. B. xv. 1059; Baxter, ii. 144.

99. TRIODIA—*Trio'dia decum'bens.*

Hedgebanks, dry moors, and woods; often also in rough hilly pastures. Common. "Ormeshead, abundant, forming a great portion of the turf on the declivities." Fl. July, August.

E. B. xi. 792 (as *Poa decum'bens*); Baxter, vi. 488.

Remarkable in having the upper surface of the leaves pale glaucous, and the under one full deep green. Also in having the usually membranous ligule reduced to a few short hairs.

100. SILVERY KŒLERIA—*Kœle'ria crista'ta.*

Dry hillsides, green downs, and open breezy places, preferring limestone. Not rare, though in some parts unknown. Fl. June, July.

E. B. ix. 648 (as *Aira crista'ta.*)

101. Sesleria—*Sesle'ria cæru'lea.*

Fields and waste places in the subalpine districts of the north of England, Scotland, and the north and west of Ireland. Plentiful on the limestone hills of Yorkshire. On the coast of Connemara, close to the sea; and near the Shannon, the staple of the pasture. Fl. May, June.

E. B. xxiii. 1613; Baxter, iii. 192.

102. Common Reed—*Arun'do Phragmi'tes.*

Ditches, shallow streams, and pondsides; often composing dense forests, and obscuring the water; also in damp hedges, cloughs and woods, and even in salt-marsh ground. Common all over Britain. Fl. August, September.

E. B. vi. 401 (too pale); Baxter, v. 372.

The largest and stateliest of the British grasses, reed-like in its stems and leaves, often rising 8 feet high, and in its immense panicles of brownish-purple and downy flowers, quite of tropical aspect. The latter, if gathered just before ripe, make a splendid ornament for the hall or mantel-piece during winter. A variety with procumbent stems, reaching 20—40 feet in length, and sometimes at the joints, grows on wet banks of sand and slipped clay on the southern and eastern shores of the Isle of Wight. No flowers are produced.

103. Feather-grass—*Sti'pa penna'ta.*

Reported, a century ago, from Westmoreland, and said to be still there, growing in small quantity, out of chinks in limestone rocks. Fl. July, August.

E. B. xix. 1356; Baxter, iii. 200.

Very common in gardens, especially in the south.

Though few grasses are objects of ornament in the sense that flowers are, no family contains plants that excite more solicitude, or that are identified more completely with the welfare of the nation. First the crop of hay, then the harvest of corn,—on the goodness or failure of these, all men's thoughts turn for at least a while every year, and little as they may be cared for as objects of botany, at midsummer, if at no other time, a few grasses hold the first place in popular interest. Those of the meadows and pastures have been indicated above. They amount to only 20 or so of the whole 103 accounted indigenous, and only 10 or 12 form the ordinary constituents of a hay-field. The 20 referred to are—

10. Sweet-scented Vernal-grass.
13. Meadow Cat's tail.
18. Meadow Fox-tail.
26. Common Bent-grass.
27. White Bent-grass.
36. Tufted Hair-grass.
43. Yellow Oat-grass.
44. Silver Oat-grass.
45. Meadow Soft-grass.
53. Meadow Barley-grass.
59. Common Ray-grass.
63. Upright Perennial Brome-grass.
68. Common Meadow Brome-grass.
70. Sheep's Fescue.
71. Meadow Fescue.
75. Rough Cock's-foot.
76. Crested Dog's-tail.
78. Common Quaking-grass.
89. Smooth Meadow-grass.
90. Roughish Meadow-grass.

The Cereals are even fewer in number. There are only seven principal kinds, and of these seven, only four are grown by farmers; namely, wheat, barley, oats, and rye. The other three,—cultivated very extensively in foreign countries for the sake of food, and more or less commonly in England, as curiosities,—are millet, rice, and maize or Indian-corn. In fact, with the exception of the wild Canadian-rice, *Ziza'nia aquat'ica,* and two or three *Eleusi'nes,* &c., in the eastern tropics, these seven are the only cereals known to any part of the world. Some of them have many varieties, and of millet and barley there are several distinct species; viewed, however, as objects of agriculture, they may be regarded as no more than said. It is easy to learn these seven cereals. Three of them, wheat, barley, and rye, bear the grain in *spikes;* three others, oats, millet, and rice, produce it in *panicles;* the seventh, maize or Indian-corn, is a monœcious plant, producing a great terminal panicle of male flowers, and several lateral and axillary spikes of female flowers, which in due time are succeeded by handsome and massive heads of fruit. The presence or absence of awns or "beards" is no criterion, as many suppose, by which to distinguish certain of the common grains from one another, as barley from wheat, seeing that both conditions occur in the same genus. The infallible marks are found in the shape of the grain and the nature of its covering. Wheat and rye are both naked,—the grains of the former quite concealed in the chaff, those of the latter protruding beyond it,—while barley is closely invested with coherent skins, and tapers at each extremity. Similarly, among the panicled grains, millet is small, spherical, and naked; rice is oblong and flattened; and oats are acutely pointed at each extremity.

Grasses suited for garden ornament have latterly been much sought after, and many very pretty kinds are now common. In addition to the English species named above, there are *Bri'za max'ima,* various species of *Agros'tis, Brizopy'rum, Eragros'tis, Pas'palum, Pennise'tum, Achnodon'ton, Æ'gilops, Ceratochlo'a, Pan'icum, Tricholæ'na, Horde'um,* and *Chrysu'rus.* Many of them form an admirable foil to gay colours in bouquets; and for winter parlour-ornament, mingled with everlastings, they are inestimable. It happens not uncommonly that foreign grasses of this description spring up in waste places, on manure-heaps, and even in the fields, originating from seeds accidently carried out with garden refuse, though quite as often perhaps, from the dusting-out of sacks and bags that have contained articles imported from abroad. The vicinity of paper-works and of large manufacturing towns are especially noted for these occurrences. The cereals, especially oats and rye, similarly spring up not uncommonly from seeds deposited by accident, or that have lain in the ground for years, the relics of some long anterior crop.

But above all that are in cultivation, towers, in every sense of the word, the grand "Pampas-grass," *Gyne'rium argen'teum,* one of the most splendid decorations for a lawn or large parterre that has been introduced for many years. Huge feathery panicles of at least two feet in length, and of the most beautiful silvery whiteness, are elevated by scores to the height of nine or ten feet, every panicle, as it ripens, becoming a mass of vegetable silk. *Erian'thus Raven'næ* is of the same general character, but not so large. The celebrated Tussack-grass of the Falkland Islands, *Dac'tylis cæspito'sa,* is also handsome, but hard and rough.

In conservatories and hot-houses are grown the Sugar-cane, Sac'charum offici-

na'rum; the Bamboo, *Bambu'sa arundina'cea;* the Lemon-grass, *Andropo'gon Schœnan'thus;* species of the beautiful genera *Chlo'ris* and *Eleusi'ne,* and the plant which produces the curious lavender-coloured ovoid beads, commonly known in parlour-museums as "Job's-tears," botanically *Coix Lachry'mæ.* When on the plant, these hang from the branchlets of a large panicle, much in the same way that the spikelets do in a sylvan *Bro'mus.* The growth of the Bamboo is remarkably interesting, alike from its rapidity, and from the mode of evolution. The stem is at first straight as a lance, and terminates in a point, with a large scale-like leaf at every joint. By and bye the scale falls off, and from the axil rises a cluster of short branches charged with proper leaves, the clusters ornamenting the stem at regular intervals, bending away from it gracefully, and when the plants are crowded, forming cradles by their commixture.

CLXXXVI. THE SEDGE FAMILY.—*Cypera'ceæ.*

Superficially, the plants of this family bear a strong resemblance to grasses. In many points of structure they also approach very closely. The roots are fibrous, and the stems slender and straw-like, but the latter, instead of being in almost every case, round, hollow, and jointed, here are more frequently triangular and solid, and rarely provided with partitions. The leaves, like those of grasses, are long, narrow, and slender; here, however, instead of being soft and succulent, they are usually hard, rigid, and coarse, and often so exceedingly sharp at the edges as to cut the fingers if gathered incautiously. When provided with sheaths at the base, the tube formed by the sheath is perfect, not open down one side as in grasses, so that it can only be removed by tearing. The flowers, as in grasses, are borne in little brown or greenish "spikelets," the latter either solitary and terminal, or disposed in panicles, spikes, or racemes, or occasionally, in umbels. In some genera the flowers are unisexual, and in the large and important genus *Ca'rex,* they are often very distinctly apart; the male flowers composing a terminal and erect catkin, with abundant brown or yellow anthers, while the females are in several other catkins, on the upper and middle part of the plant, and often remarkable for their length, beautiful cylindrical form, and elegantly pendulous position. In the bisexual genera, every spikelet rests in the axil of a leafy or scaly bract, the spikelet consisting in itself of several smaller and imbricated bracts, in the axils of which are the minute and sessile flowers. The latter are destitute of perianth, (except occasionally a few bristles or minute scales,) and consist of three, or rarely two, stamens, and a solitary pistil; the anthers are attached by the base, instead of in the centre (as happens with grasses), and with the cells *not* divergent at the extremities; the ovary is one-celled, and the style more or less deeply divided into two or three flattened or linear branches, which are *not* feathery. The fruit is small and seed-like, flattened when the styles or branches are two; triangular when they are three. The frequently conical form of the spikelets, and the imbrication of the bracts, give them in many instances, the aspect of a miniature fir-cone, especially if viewed with a lens.

The Cyperaceæ are distributed freely all over the world, growing in every habitat in which it is possible for flowering-plants to live, from the hottest and driest to the coldest and marshiest. Woods, rivers, ponds, swamps, moors, mountains; the dry, drifting sandbanks on the sea-shore, are occupied more or less abundantly by their representatives, the total number of species amounting probably to two thousand. Broadly speaking, they are plants of little direct utility. Hard, juiceless, and destitute of saccharine principles, the herbage is nearly valueless as fodder and pasturage; the only purpose they seem to serve is the binding together of soil otherwise loose and impassable, and thus preparing the way for the implements of the agriculturist. Nearly the whole being perennial, they serve this purpose effectually, and most interesting it is to witness, on the borders of the moors and fens, how certainly, though reluctantly, they are in time compelled to capitulate to civilization.

Of British species there are upwards of seventy, or, as some estimate them, nearly ninety. A few are very handsome, and many are pretty and interesting, but as a tribe for study they are rather difficult. It is necessary to watch most through their entire progress, or from the period of blooming to that of the ripening of the fruit, and many species can only be told with certainty when the latter is perfect; the "cotton-grasses," which in early summer cover the moorland with vegetable snow, are, while in bloom, quite insignificant, and except to the experienced, give no promise. This circumstance is still more noticeable in the case of the genus *Ca'rex*, which comprises more than a fourth of the whole family, and nearly two thirds of the indigenous representatives. Every part of the country yields abundance of examples, and districts here and there are particularly rich—none perhaps excelling the neighbourhood of Manchester, which, in its low-lying level and wetness, and in the moors, ponds, damp cloughs, and swampy hollows, with no outlet for their waters, that are found in almost every direction, supplies the favourite residences of a large proportion of the British species. May is the principal period of their appearance, but midsummer is a better time to collect specimens for study, since the fruits of most are then definitely formed, and the other characters are not effaced. *English* names the Cyperaceæ can scarcely be said to possess, very few being objects of observation, except with the botanist, and perhaps it is scarcely desirable that English names should, as a rule, be applied to them. Botanists care only to use the Latin names, and although English ones have been contrived for the whole, they exist only in print. "Sedge" and "bulrush," are a part of the national language, and such names as these it is both right and useful to recognise, but none of the newly made ones are ever likely to become so, and they may as well be discarded at once. In the following key to our native species, I have departed accordingly, from the plan hitherto pursued in this volume, and have used the Latin names exclusively, reserving the scanty English names for citation in the list of habitats.

SECTION I.

FLOWERS BISEXUAL; *i. e.* two or three stamens and a pistil in company under all or most of the glumes of every spikelet.

1. Spikelets sessile, and disposed in 2-ranked terminal spikes 1—2 inches long; stems 6—8 inches high; glumes dark-brown.
    Spikelets 6—8-flowered. Leaves flat, rough along the edges and down the keel. 8. *Blys'mus compres'sus.*
    Spikelets 2—4-flowered. Leaves smooth, channelled, and without a keel. 7. *Blys'mus ru'fus.*
2. Spikelets very numerous, and disposed in large panicles, or compound corymbs; stems 2—3—4 feet high, stout and leafy.
    * Glumes disposed in two opposite ranks, so that the spikelets are *flat.* Stem simple, jointless, polished, triangular, 2—3 feet high. Panicle umbellate, elegantly drooping, rich chesnut and green. Root aromatic. 1. *Cype'rus lon'gus.*
    ** Glumes imbricated.
    Spikelets rich brown. Rootstock creeping. Stems rounded, 3—5 feet high. Margins and keel of the leaves prickly with minute teeth. Clusters of spikelets produced from the upper axils, the whole forming a terminal, more or less leafy, narrow and erect panicle, 12—18 inches long. 4. *Cla'dium Maris'cus.*
    Spikelets dark grayish-green. Stems triangular, 2—3 feet high. Panicle corymbose, 6—12 inches in diameter, spreading, and with two or three long, linear, and leaf-like bracts at the base. 9. *Scir'pus sylvat'icus.*
3. Clusters perfectly *globular,* and about half an inch in diameter. Stem round, leafless, 3—5 feet high. Heads 1—15, partly sessile, partly pedunculate. Glumes brown, variegated with white. 14. *Scir'pus Holoschœ'nus.*
4. Spikelets *black.* Stems numerous, simple, naked, rigid, cylindrical, 8—18 inches high. Head roundish, ovoid, ¼—½ of an inch long, overtopped by one of the bracts. 3. *Schœ'nus ni'gricans.*

5. Spikelets forming *solitary and terminal spikes*, which are compact, cylindrical, or ovoid, sometimes nearly an inch in length, sometimes extremely minute. Occasionally the lower bract is leafy, and elongated above the spike, so as to make it appear lateral. Ovary surrounded in many cases, by hypogynous bristles.

* Hypogynous bristles long and conspicuous. Spikes erect.

Bristles numerous. Spike ovoid, half an inch long, deep olive-green; when in fruit becoming a nearly globular, silvery-white, and very beautiful silky tuft, an inch or more in diameter, owing to the growth of the hypogynous bristles. Herbage densely tufted; stems 10—12 inches high, and bearing one or two sheaths, which sometimes end in short leaves, the upper sheath remarkably inflated. 23. *Eriph'orum vagina'tum.*

Bristles only six. Stem 1—6 inches high. Spike minute.
25. *Erioph'orum alpi'num.*

** Hypogynous bristles short and inconspicuous, or none.

† Stems branched, floating in water, or prostrate and matted together on the margin. Spike minute. 22. *Scir'pus flu'itans.*

†† Stems simple and erect, leafless and sheathless, unless quite at the base.

‡ Spike minute, grayish, surmounted by a leafy bractea, and *pointing obliquely*. Stems slender, tufted, 2—6 inches high.

Fruit furrowed. 15. *Scir'pus seta'ceus.*
Fruit without furrows. 16. *Scir'pus Sa'vii.*

‡‡ Spike *erect*, often minute.

a. Outer bract with a leafy tip. Stems very rigid, densely tufted, 2—12 inches high. Spikes light brown.
20. *Scir'pus cœspito'sus.*

b. No leafy tip to the lower bract. Stems as fine as hair, barely 2 inches high. Root with thread-like runners. 21. *Scir'pus acicula'ris.*

c. No leafy tip to the lower bract. Stems more or less rigid and substantial, 3—12—18 inches high.

A. Styles mostly 2-cleft. Stems 8—15 inches high. Spike half an inch long.
17. *Scir'pus palus'tris.*

B. Styles mostly 3-cleft. Sheaths at the base of the stem with a short leafy tip. Stems 2—12 inches high, densely tufted, and very rigid. Spike minute.
20. *Scir'pus cœspito'sus.*

C. Styles mostly 3-cleft. Sheaths at the base of the stem *without* a leafy tip.

Spike many-flowered
18. *Scir'pus multicau'lis.*

Spike 3—6-flowered.
19. Scir'pus pauciflo'rus.

6. Spikelets clustered into spikes that are shaped, &c., as in the preceding group; or into small corymbose or umbellate heads. In the former case, the spikes 2—6 or more; in the latter, the heads manifestly compound.

- * Pond, river-side, and salt-marsh plants; mostly tall.
  - † Stem leafy, triangular, 1—3 feet high. Spikes ovoid, long, soft, partially peduncled, and with many leaves about them. 11. *Scir'pus marit'imus.*
  - †† Stem leafless, or with only a single short leaf near the base.
    - ‡ Stem *cylindrical*, or nearly so, erect, slender, 2—3—6—8 feet high. Spikes brown, ovoid, about half an inch long, rather numerous, and clustered into an irregular terminal corymb, which is rendered apparently lateral by the outer bract growing an inch or two beyond it. 10. *Scir'pus lacus'tris.*
    - ‡‡ Stem acutely triangular.
      - Spikes all sessile. Stem slender, 6—18 inches high. 13. *Scir'pus pun'gens.*
      - Spikes more or less peduncled. Stem 3—4 feet high. 12. *Scir'pus trique'ter.*
- ** Bog and moorland plants, 6—9—15 inches high. Stems leafy, simple, and erect.
  - † Stems with a creeping rootstock. All the glumes with flowers. Leaves hard, broad, and often channelled. Spikes ovoid, half an inch long, olive-green, in a terminal umbel of 3—6—10—12, the inner ones sessile, the outer ones on peduncles which are often 2—3 inches long. As the seed ripens, the spikes become large and very beautiful silky tassels of a shining white, owing to the growth of the hypogynous bristles, and then droop elegantly. 24. *Erioph'orum polysta'chyon.*
  - †† No creeping rootstock. Leaves few, short, and very slender. Several of the lower glumes empty. Heads half an inch in diameter, and loosely corymbose. Stems very slender.
    - Spikelets nearly white. Stamens two. Hypogynous bristles numerous. Often with one of two smaller clusters on slender peduncles in the axils of the upper leaves. 5. *Rhyncos'pora al'ba.*
    - Spikelets shining reddish-brown. Stamens three. Hypogynous bristles only three. 6. *Rhyncos'pora fus'ca.*
- ⁂ Diminutive marshy-ground annuals.
  - † Spikelets in two opposite ranks. The spikes forming a small compound umbel. Stems several, 4—6 inches high. Glumes brown. 2. *Cype'rus fus'cus.*
  - †† Heads 2—3, minute, grayish, sessile, *pointing obliquely*, and surmounted by a leafy bractea. Stems slender, tufted, 2—6 inches high.
    - Fruit with longitudinal furrows. 15. *Scir'pus seta'ceus.*
    - Fruit without furrows. 16. *Scir'pus Sa'vii.*

SECTION II.

FLOWERS UNISEXUAL. *Ovary partially enclosed in one or two distinct scales.* Male flower above, and without scales. Stems erect, 6—12 inches high. Spikelets 4—5, near together at the summit. 26. *Kobre'sia.*

SECTION III.

FLOWERS UNISEXUAL. *Ovary enclosed in a bottle-shaped or urn-shaped utricle*, at the summit of which is an orifice. Style solitary, and protruded through the orifice. Stigmas 2 or 3, occasionally 4. Utricle persistent round the ripe fruit. (*Comprising Carices only.)*

A.

Flowers diœcious. Flower-stems 6—8 inches high. Leaves very short. Spikes solitary; those of the male plant linear, those of the female, ovoid.
27. *Ca'rex dioi'ca.*

B.

Flowers monœcious, and disposed in distinct male and female catkins; the male catkins either solitary or 2—3 together, and terminating the stem; the females below them, in the axils of leaves or bracteas, and either sessile and nearly erect, or upon peduncles. In the latter case the peduncles are often so long that the weight of the catkin renders them pendulous. (Sometimes one or two of the upper catkins are male in the upper portion, female in the lower; and there are certain rare species in which the *lower* portion of the uppermost catkin is *male*, and all the remainder of the inflorescence is *female.)*

[A.]

Stigmas two. Female catkins cylindrical or oblong, few, dark-brown or black; rootstock with creeping runners.

1. Fruits very convex or inflated. Stems 6—15 inches high. Alpine plant.
44. *Ca'rex pul'la.*

2. Fruits almost *flat.* Stems much tufted.

Glumes mostly obtuse. Anthers fine brown, and very numerous. Styles white and conspicuous. Young female catkins green, with mosaic of triangular black scales; when ripe 1¼—2 inches long, mostly sessile and erect. Stems 3—50 inches high.
45. *Ca'rex cæspito'sa, aquat'ilis, stric'ta*, and *rig'ida.*

Glumes mostly narrow and pointed. Female catkins 3—4 inches long. Stems 2—3 feet high. 46. *Ca'rex acu'ta.*

[B.]

Stigmas three. Terminal catkin female in the upper portion, male in the lower; the other catkins wholly female.

1. Catkins oblong or cylindrical, peduncled, pendulous when ripe, and very black. Fruit acutely triangular, with a short beak. Alpine plant, 6—18 inches high. 49. *Ca'rex atra'ta.*

2. Catkins short and erect.

Catkins contiguous, the lowest peduncled. Fruit angular, shortly beaked. Stem 6—12 inches high. Very rare alpine. 47. *Ca'rex Vahl'ii.*

Catkins eventually rather distant, the lowest nearly sessile. Fruit ovoid and obtuse. Herbage densely tufted, 1—2 feet high. Extremely rare Irish plant. 48. Ca'rex Buxbaum'ii.

(**B.** *continued.*)

[c.]

Stigmas three. Terminal catkin wholly male, or rarely with a few female flowers at the base. (Male catkins sometimes two or more.)

1. Bracts below the female catkins *not leaf-like.* Fruits obtuse, slightly downy.

Flower-stems 3—4 inches high, and *shorter* than the leaves. Female catkins short, distant, and half-included in the bract-sheaths. Glumes membranous and silvery edged. 50. *Ca'rex clandesti'na.*

Flower-stems 3—9 inches high, and *longer* than the leaves. Female catkins near the summit, linear, spreading, delicate pale brown. 51. *Ca'rex digita'ta.*

2. Bract of the lowest female catkin (and occasionally of the others) *leaf-like;* and the fruits *downy or hairy.*

* Female catkins short and compact, and close under the male one.

† Lowest bract shortly sheathing. Female catkins 1—3.

Glumes ovate-acuminate, and dark-hued. Fruit obovoid and acute. Stems 3—9 inches high. 55. *Ca'rex præ'cox.*

Glumes obovate, very blunt, ciliated, and white-edged. Fruit obovoid and truncate. Stems 3—6 inches high. 56. *Ca'rex ericeto'rum.*

†† Lowest bract sheathless. Stems 6—12 inches high.

Fruit not above one-tenth of an inch long, very shortly downy; female catkins about three, and nearly globular. 52. *Ca'rex pilulif'era.*

Fruit nearly one-fifth of an inch long, hairy. 53. *Ca'rex monta'na.*

** Female catkins oblong or cylindrical, the lower ones distant.

† Bracts sheathless, or nearly so.

Fruits not one-tenth of an inch long, and beakless. Catkins rather distant. 54. *Ca'rex tomento'sa.*

Fruits near one-fifth of an inch long, and tapering into a beak; leaf-like bracts 3—6 inches long. 57. *Ca'rex filifor'mis.*

†† Bracts with long sheaths. Fruits one-fifth of an inch long, hairy, and beaked. Lower catkins very distant. Rootstock creeping extensively. Stems 4—15 inches high. Whole plant more or less covered with fine white hairs. 58. *Ca'rex hir'ta.*

3. Bract of the lowest female catkin leaf-like, and the fruit *glabrous.*

* Only one male catkin (or rarely a smaller one close under it). Female catkins *erect,* or nearly so.

† Fruits obtuse and beakless, or nearly so.

Female catkins pale green, short and oblong. Plant pale and slim, 12—15 inches high. 59. *Ca'rex palles'cens.*

Female catkins blackish-brown, long and cylindrical. Stems 6—18 inches high. Anthers conspicuous, pale-yellow. 64. *Ca'rex panice'a.*

†† Fruit tapering into a beak.

a. Female catkins compact, nearly sessile, oblong and brownish-green, their bracts very narrow, 6—8 inches long. Leaves convolute. Plant 1—2 feet high. 60. *Ca'rex exten'sa.*

(Bract of the lowest female catkin leaf-like. Fruits glabrous and beaked. Only one male catkin. Female catkins erect or nearly so.)

b. Female catkins compact and nearly sessile, their bracts usually *less than four inches* long.

A. Female catkins short, roundish, yellowish, mostly near the top of the stem, the lowermost one often distant. Fruits very spreading, the lower ones deflexed. Plant yellowish. Stems 3—12 inches high. 61. *Ca'rex fla'va* and *Œde'ri.*

B. Female catkins oblong, delicate green and brown, and all very distant.

Fruit ribbed. Stems 12—20—50 inches high.
62. *Ca'rex dis'tans, ful'va, biner'vis, læviga'ta,* and *depaupera'ta.*

Fruit ribless. 63. *Ca'rex puncta'ta.*

C. Female catkins loose, cylindrical, and stalked;—green also, and the fruits long-beaked.

Peduncles of the lower catkins very long. Stems 12—20 inches high. Plant delicate and tufted.
68. *Ca'rex sylvat'ica.*

Peduncles short. Plant stout, 2—3 feet high.
62. *Ca'rex lævigа'ta.*

D. Female catkins as in C., but brown, and the fruits short-beaked. Stems 6—12 inches high.
64. *Ca'rex phæosta'chya.*

** Only one male catkin. Female catkins on long peduncles, and more or less pendulous.

a. Female catkins seldom above an inch long, usually less, and *green*. Fruits oval and beakless. Stems 12—15 inches high.
59. *Ca'rex palles'cens.*

b. Female catkins seldom above an inch long, usually less, and *brown, or very dark.*

† Fruits beaked. Bract-sheaths long. Roostock not creeping. Stem slender, 3—9 inches. 65. *Ca'rex capilla'ris.*

†† Fruits beakless. Rootstock creeping.

Fruits compressed. Plant slender, 3—12 inches high.
66. *Ca'rex limo'sa, irrig'ua,* and *rariflo'ra.*

Fruits ovoid. Herbage glaucous. Plant 3—18 inches high. 67. *Ca'rex glau'ca.*

c. Female catkins 1—6 inches long.

† Delicate sylvan plants. Stems weak, 1—2 feet high. Female catkins distant, slender, and greenish. Fruits far apart.

Catkins 1—2 inches long, on obvious hair-like peduncles 3—4 inches long. 68. *Ca'rex sylvat'ica.*

Catkins 2—3 inches long, their peduncles almost concealed in the sheaths. 69. *Ca'rex strigo'sa.*

(Bract of the lowest female catkin leaf-like. Fruit glabrous. Only one male catkin. Female catkins on long peduncles, and pendulous.)

†† Elegant waterside plants. Stems strong and stout, and not less than 2 feet high.

Female catkins about 2 inches long, and their peduncles nearly the same. Glumes and fruits spreading, their points long and prickly. Stems 2—3 feet high. 71. *Ca'rex Pseudo-cype'rus.*

Female catkins 4—6 inches long; when mature, slender and cylindrical; their peduncles almost concealed in the sheaths. Fruits small, very shortly pointed. Stems 3—5 feet high. 70. *Ca'rex pen'dula.*

∴ Two or more male catkins.

† Fruits obtuse. Female catkins dark-brown. Herbage glaucous. Plant 3—16 inches high. 67. *Ca'rex glau'ca.*

†† Fruits beaked or pointed. Marsh plants, 2—3 feet high.

‡ Fruits inflated.

Fruits globular, abruptly contracted into a long beak, abundant, crowded, and yellowish. Female catkins about three, erect and nearly sessile. 72. *Ca'rex ampulla'cea.*

Fruits tapering into a short beak. Female catkins few, large, oval, and green. 73. *Ca'rex vesica'ria.*

‡‡ Fruits much flattened. Male catkins 3—5, black or deep-brown. Female catkins erect, sessile, and dark. Herbage glaucous. Anthers fine brown. 74. *Ca'rex paludo'sa* and *ripa'ria.*

C.

Flowers monœcious, disposed either in simple spikes, or collected into spikelets. In the latter case, the spikelets (except in *C. remo'ta)* either (*a*) clustered into heads, or (*β*) into spikes that are more or less interrupted; or, in one instance, *(C. panicula'ta)* disposed in panicles. No catkins.

1. Lower spikelets in the axils of leaf-like bracts, which are at least 2—3 inches long; the spikelets green or pale.

Not only the lower spikelets, but the upper ones also, sessile in bract-axils, and all simple and distant; the lower spikelets usually 2—3 inches apart. Herbage pale and grass-like. 36. *Ca'rex remo'ta.*

A long bract only to the *lowest* spikelet; a shorter one to the next above, and the upper spikelets without. Spikelets 6—14, the upper ones usually crowded, all usually sessile, the lowermost sometimes branched or compound. Stems 12—18 inches high. 37. *Ca'rex axilla'ris.*

2. Bracts, when present, not of remarkable length; the spike *perfectly simple*, and male at the upper part.

• Stigmas two. Stems 3—9 inches high. Fruits, when ripe, dark-brown, rather distant, spreading horizontally and downwards, acute at each end, and resembling fleas. 28. *Ca'rex pulica'ris.*

•• Stigmas three. Stems 3—6 inches high.

Fruits obtuse. 29. *Ca'rex rupes'tris.*

Fruits tapering. 30. *Ca'rex pauciflo'ra.*

(**C.** *continued.* Flowers monœcious, and disposed in spikelets, which are collected into spikes. No catkins.)

3. Bracts, when present, not of remarkable length, and the spikes *compound.*

* Terminal spikelet male at the base.

† Spikelets ovoid and close together.

Fruits winged at the edges. Spikelets 4—6, large, olive-brown, shining, and each with a large ovate bractea at the base. Stems 12—24 inches high. 31. *Ca'rex ova'lis.*

Fruits not winged. Stems 8—9 inches high. Rare alpine plant. 32. *Ca'rex lepori'na.*

†† Spikelets, or at least the lower ones, at a little distance from one another.

‡ Fruits tapering to a point. Spikelets 6—8.

Spikelets, when ripe, nearly globular, the fruits few, greenish, and spreading in all directions. Stems 6—18 inches high. 34. *Ca'rex stellula'ta.*

Spikelets, when ripe, chesnut-brown, long and narrow. Stems 2 feet high. 33. *Ca'rex elonga'ta.*

‡‡ Fruits ovoid, erect, and minutely pointed. Spikelets 5—6, alternate, short, oval, pale, and silvery. Stems 12—18 inches high. 35. *Ca'rex cur'ta.*

** Terminal spikelet male at the top. Clusters often compound.

† Rootstock long and creeping.

‡ Spikelets ovoid and rather large, the clusters brown, almost triangular, and pointed, the stems bending with their weight. Fruits with a very thin or winged edge. Stems 3—12 inches high. 41. *Ca'rex arena'ria* and *interme'dia.*

‡‡ Clusters short and dense. Fruits very convex, not winged.

Cluster ovoid, barely an inch long. Spikelets 4—6. Stems slender, erect, 12—18 inches high. 42. *Ca'rex divi'sa.*

Clusters nearly globular, more than an inch long, and pointed. Spikelets 5—10. Stems 3—6 inches high, the upper portion incurved. 43. *Ca'rex incur'va.*

†† Stems tufted, without creeping rootstocks.

Clusters light-brown, large, thick, densely-crowded, 2—3 inches long, the lower spikelets sometimes a little separated. Stems 18—24 inches high, stout, rough, and sharply triangular. Fruits much flattened, with acute angles. 39. *Ca'rex vulpi'na.*

Spikelets very numerous, the clusters more or less panicled, the lower ones being compound and often branched, though sometimes sessile. Panicle 2—4—6 inches long. Fruits obtusely triangular and acuminate. Stems 2—4 feet high. 38. *Ca'rex panicula'ta, teretius'cula,* and *paradox'a.*

Spikelets 6—8, either nearly in contact, or a good deal separated, the clusters 1—2—4 inches long. Fruits scarcely angular, yellowish, and long-beaked. Stems 12—15 inches high. 40. *Ca'rex murica'ta* and *divul'sa.*

HABITATS AND DISTRIBUTION.

1. *Cype'rus lon'gus* (GALINGALE.)—Marshes, damp meadows, and along the marshy sides of rivulets; very rare, and found only in the south of England. Castlemead, the extreme south point of the Isle of Wight, in the greatest profusion. Channel Islands, abundant. Fl. August, September.

E. B. xix. 1309; Baxter, vi. 452.

2. *Cype'rus fus'cus.*—Wet meadows; extremely rare, and hitherto found only in Middlesex and Surrey. Fl. July, August.

Curtis, iii. 441; E. B. Supp. i. 2626.

3. *Schœ'nus ni'gricans.*—Boggy and marshy places, chiefly on the sea-coast, and sometimes close to high-water mark. Widely diffused, but not very common. Fl. July.

E. B. xvii. 1121; Baxter, iv. 268.

4. *Cla'dium Maris'cus.*—Bogs, fens, marshes, and on the edges of lakes and meres; widely diffused, but rare, especially in Scotland. Northamptonshire, abundant. Askern, near Doncaster. Fl. July.

E. B. xiv. 950 (as *Schœ'nus Maris'cus*); Baxter, vi. 500.

5. *Rhyncos'pora al'ba.*—Wet moors and heaths, often forming thin green meadows in the midst of the swamp, and relieving the darkness of the peat with its white heads. Common. Near Manchester, very abundant. Fl. July, August.

E. B. xiv. 985 (as *Schœ'nus al'bus*); Baxter, v. 396.

6. *Rhyncos'pora fus'ca.*—Bogs; rare, and nearly confined to the south and west of England. Heaths about Wareham, Dorsetshire. Found also in Ireland. Fl. July, August.

E. B. xxii. 1575 (as *Schœ'nus fus'cus.*)

7. *Blys'mus ru'fus*—Marshy ground, especially near the sea, and particularly where apt to be overflowed. Common in the east and south of England. Fl. June—August.

E. B. xv. 1010 (as *Schœ'nus ru'fus.*)

8. *Blys'mus compres'sus.*—Bogs and marshes; widely diffused, but rather rare. Fl. summer.

E. B. xi. 791 (as *Schœ'nus compres'sus*); Baxter, iv. 308.

9. *Scir'pus sylvat'icus.*—Marshy places, especially where shaded by trees; common. Near Manchester, abundant. Fl. July, August.

E. B. xiii. 919.

10. *Scir'pus lacus'tris* (COMMON BULRUSH.)—Lakes, meres, and large ponds, near the margin; common, and generally growing in immense quantities. Fl. June, July.

Curtis, iii. 442; E. B. x. 666.

Scir'pus glau'cus or *Tabernæmonta'ni* (E. B. xxxiii. 2321.) is not essentially different from this, nor is *Scir'pus carina'tus* (xxviii. 1983; Curtis, iii. 443.) anything more than a slight variety.

11. *Scir'pus marit'imus.*—Salt-marshes, and on the muddy banks of estuaries and great tidal rivers; common all round Britain, and usually growing in large masses. Sometimes far from the sea, as in Longdon marshes, Worcestershire, which anciently were exposed to brackish back-waters. Fl. June—August.
Curtis, ii. 221; E. B. viii. 542; Baxter, iv. 264.

12. *Scir'pus trique'ter.*—River-banks; very rare, and confined to the extreme south-east of England. Fl. August.
Curtis, iii. 444; E. B. xxiv. 1694.

13. *Scir'pus pun'gens.*—Jersey, on the borders of St. Ouen's pond. Fl. July.
E. B. Supp. iii. 2819.

14. *Scir'pus Holoschæ'nus.*—Braunton Burrows, near Barnstaple, on the southern side, about a quarter of a mile from the twin light-houses, where there is a line of pools and marshy hollows that terminate in a little marsh close to the shore. Found also in Somersetshire. Fl. July.
E. B. xxiii. 1612.

15. *Scir'pus seta'ceus.*—Low marshy meadows; waste and swampy ground; wet waysides, &c. Common Fl. July, August. Annual?
Curtis, iii. 445; E. B. xxiv. 1693.

16. *Scir'pus Sa'vii.*—Marshy places, chiefly near the sea, and principally in the south and west. West bank of the Torridge, near Appledore, North Devon. Fl. Summer.
E. B. Supp. ii. 2782.

17. *Scir'pus palus'tris* (COMMON SPIKE-RUSH.)—Wet and marshy places, borders of ponds, &c., with rushes, &c.; common everywhere. Fl. June, July.
E. B. ii. 131; Baxter, vi. 436 (as *Eleoch'aris palus'tris.)*

18. *Scir'pus multicau'lis.*—Similar situations; but not quite so frequent. Fl. June, July.
E. B. xvii. 1187.

19. *Scir'pus pauciflo'rus.*—Similar situations; common, except in the south. Fl. July.
E. B. xvii. 1122.

20. *Scir'pus cæspito'sus* (DEER'S-HAIR.)—Wet moors and heathy swamps, ascending, in mountainous districts, to great elevations. Common, except in the south. Fl. May, June.
E. B. xv. 1029.

21. *Scir'pus acicula'ris.*—Wet and muddy places; widely scattered, but not common. Fl. July, August.

Curtis, iii. 446; E. B. xi. 749.

22. *Scir'pus flu'itans.*—Ditches and ponds, especially where sometimes dried up, and in shallow water upon heaths. Widely diffused, but not common. Fl. August.

E. B. iii. 216.

23. *Erioph'orum vagina'tum* (Hare's-tail Cotton-grass.)—Wet heaths, moors, and boggy mountain-sides. Common, and in the north extremely plentiful. Fl. April. Silvery heads by midsummer.

Curtis, ii. 227; E. B. xiii. 873; Baxter, vi. 427.

24. *Erioph'orum polysta'chyon* (Tassel Cotton-grass.)—Similar situations; extremely common. Fl. April. Tassels in June.

Curtis, ii. 226; E. B. viii. 563.

Two of the prettiest plants of the British Flora. While in bloom they are inconspicuous; but when in fruit, the large silvery heads present a singularly beautiful spectacle, surfaces where the *vagina'tum* is abundant seeming, if viewed at a gentle incline upwards, as if covered with snow; while the glossy tassels, white as ermine, of the *polysta'chyon*, dangling in graceful clusters from the tops of the grass-like stalks, might well be cited in the romantic poetry ascribed to Ossian—"Her bosom was whiter than the down of Cana." The desolate, flat, black moors of the north are enlivened by them for several weeks in early summer, and in the level light of the setting sun they shine like satin. No use can be made of the heads, which are "cotton" only in appearance, the hairs being straight and stiff.

Several different varieties are to be met with, all of them, as in other cases, by some authors considered species. These are *Erioph'orum angustifo'lium*, (E. B. viii. 564.) differing from the normal form only in its narrow leaves; *Erioph'orum pubes'cens*, (E. B. Supp. i. 2633.) tall and slender, and with rough peduncles; and *Erioph'orum gra'cile*, (E. B. xxxiv. 2402; Supp. iv. 2886.) also tall and slender, and with fewer heads.

25. *Erioph'orum alpi'num.*—Formerly found in a bog near Forfar. Now probably extinct. Fl. summer.

E. B. v. 311.

26. *Kobre'sia carici'na.*—Wet moors; very rare, and found only in the north. Teesdale. Perthshire. Fl. summer.

E. B. xx. 1410 (as *Schœ'nus monoi'cus*); Baxter, vi. 484 (as *Ely'na carici'na.*)

27. *Ca'rex dioi'ca.*—Marshy and boggy places; common, except in the south. Fl. May, June.

E. B. viii. 543.

28. *Ca'rex pulica'ris* (Flea Carex.)—Heathy ground, and in bogs; common. Fl. June, July.

Curtis, iv. 640; E. B. xv. 1051.

29. *Ca'rex rupes'tris.*—Wet rocks upon mountains in the Scotch Highlands. Fl. summer.

E. B. Supp. iii. 2814.

30. *Ca'rex pauciflo'ra.*—Moors and swamps. In the Scotch Highlands not uncommon. Fl. June.

E. B. xxix. 2041.

31. *Ca'rex ova'lis.*—Low, wet meadows, and swampy places; common. Fl. June, July.

E. B. v. 306.

32. *Ca'rex lepori'na.*—Mountains in the Scotch Highlands; very rare, and apparently confined to Loch-na-gar, and to the summit of Cairn Toul, between three and four thousand feet above the level of the sea, in the latter of which localities it is plentiful. Fl. summer.

E. B. Supp. iii. 2815.

33. *Ca'rex elonga'ta.*—Marshy places, and pondsides; rare. Near Manchester, in several places. Fl. June.

E. B. xxvii. 1920.

34. *Ca'rex stellula'ta.*—Marshy and heathy ground, among grass; common. Fl. May, June.

E. B. xii. 806.

35. *Ca'rex cur'ta.*—Boggy and watery places, sides of ponds, and in ditches, especially on the borders of moors; common. Near Manchester very abundant. Fl. June, July.

E. B. xx. 1386.

36. *Ca'rex remo'ta.*—Ditch-banks, sides of ponds, and in moist woods and cloughs; very common, except in Scotland. Fl. May, June.

E. B. xii. 832.

37. *Ca'rex axilla'ris.*—Woods and shady banks; very rare. Plentiful among the brick-ponds at Hob Moor, near York. Fl. June.

E. B. xiv. 993.

A variety of this is called by some botanists *Ca'rex Bœnninghausenia'na*, (E. B. Supp. iii. 2910.)

38. *Ca'rex panicula'ta.*—Swampy and spongy pastures, damp woods, and on the borders of ponds and canals; common. Fl. June, July.

E. B. xv. 1064.

Ca'rex teretius'cula, (E. B. xv. 1065.) though much smaller, is no doubt a modification of the same type.

Ca'rex paradox'a, (E. B. Supp. iv. 2896.) plentiful in Askham bogs, Yorkshire, and *Ca'rex pseu'do-paradox'a*, seem to unite them, the differences consisting in little more than size.

39. *Ca'rex vulpi'na.*—Wet and shady places, especially near water, and upon ditch-banks; common, except in Scotland. Fl. May—July.

E. B. v. 307.

40. *Ca'rex murica'ta.*—Fields, meadows, and hedge-banks, both dry and moist. Not uncommon. Fl. May, June.

E. B. xvi. 1097.

Ca'rex divul'sa (E. B. ix. 629.) appears to differ only in the smaller fruit.

41. *Ca'rex arena'ria.*—Sand-hills on the sea-coast. Common all round Britain, and generally very plentiful. Occasionally inland, as at Mildenhall, Suffolk, where, as if the ground were an old sea-margin, it is associated with *Phle'um arena'rium.* Fl. June, July.

E. B. xiii. 928.

Carex dis'ticha, or *interme'dia,* (E. B. xxix. 2042.) is a tall variety, reaching 1—2 feet high, and found in marshy places inland.

42. *Ca'rex divi'sa.*—Marshes, especially near the sea; common, except in the north, and in Scotland not found. Fl. May, June.

E. B. xvi. 1096.

43. *Ca'rex incur'va.*—Sandy seashores of the north of Scotland. Fl. July, August.

E. B. xiii. 927.

44. *Ca'rex pul'la.*—Lofty mountains in the Highlands of Scotland. Fl. summer.

E. B. xxix. 2045.

Ca'rex Gra'hami (E. B. Supp. iv. 2923.) is by Mr. Bentham referred to this species.

45. *Ca'rex cæspito'sa.*—Swampy places, low wet pastures, and on the borders of moors and wet heaths; common. Fl. May, June.

E. B. xxi. 1507.

Includes the forms usually distinguished as *Ca'rex stric'ta,* (E. B. xiii. 914.) *ri'gida,* (xxix. 2047.) and *aquat'ilis,* (Supp. ii. 2758.)

46. *Ca'rex acu'ta.*—Moist meadows and swampy places; not uncommon. Fl. May, June.

Curtis, ii. 282 (as *Ca'rex gra'cilis*); E. B. ix. 580.

47. *Ca'rex Vahl'ii.*—Clova mountains, Highlands of Scotland; extremely rare. Fl. summer.

E. B. Supp. i. 2666.

48. *Ca'rex Buxbaum'ii.*—Upon an island in Lough Neagh, Ireland, the only known British locality. Fl. July.

E. B. Supp. iv. 2885.

49. *Ca'rex atra'ta.*—Alpine rocks and heathy ground; rare. Highlands of Scotland. Llanberris. Fl. June.

E. B. xxix. 2044.

50. *Ca'rex clandesti'na.*—Dry and earthy places upon limestone-rocks in Gloucestershire, Somersetshire, Wiltshire, and Herefordshire. St. Vincent's rocks, near Bristol, below the sea-walls. By the Wye, near Ross, growing with *Gera'nium sanguin'eum, Hippocre'pis, Filipen'dula,* &c., and often nearly covered by them. Brean Down, Weston-super-mare, with *Helian'themum polifo'lium.* Fl. April, May.

E. B. xxx. 2124.

51. *Ca'rex digita'ta.*—Woods and thickets upon limestone; rare, and only found in the south-western counties, and in Yorkshire and the Lake district. Leigh woods, near Bristol. Fl. May.

E. B. ix. 615.

52. *Ca'rex piluli'fera.*—Moors and heathy hill-sides; common. Fl. May, June.

E. B. xiii. 885.

53. *Ca'rex monta'na.*—Hilly pastures in Sussex and near Chepstow. Fl. May, June.

E. B. Supp. iv. 2924.

54. *Ca'rex tomento'sa.*—Meadows near Marston, Wiltshire, the only British locality. Fl. June.

E. B. xxix. 2046.

55. *Ca'rex præ'cox.*—Dry pastures, banks, heaths, and in parks; common. Fl. May, June, the earliest of our native Carices.

Curtis, iii. 548; E. B. xvi. 1099.

56. *Ca'rex ericeto'rum.*—Gogmagog hills, Cambridgeshire, on the grassy slope of the Roman Road. Fl. spring.

57. *Ca'rex filifor'mis.*—Wet and swampy places; rather uncommon, and especially so in the south. Borders of Oakmere, Cheshire, fine and abundant. Brookhouse-moss, near Congleton, abundant, growing with the *C. limo'sa.* Fl. May.

E. B. xiii. 904.

58. *Ca'rex hir'ta.*—Wet meadows and pastures, and especially by the sides of the trenches cut for draining them; common, except in the north of Scotland. Fl. May, June.

E. B. x. 685.

59. *Ca'rex palles'cens.*—Wet and shady places; rather uncommon. Near Manchester, frequent. Fl. June, July.

Curtis, iv. 641; E. B. xxxi. 2185.

60. *Ca'rex exten'sa.*—Sea-coasts, where marshy. Common all round Britain. Fl. June.

E. B. xii. 833.

61. *Ca'rex fla'va.*—Boggy meadows, and in wet and swampy places; common. Fl. May, June.

E. B. xviii. 1294.

Though an inhabitant of swamps, *Ca'rex fla'va* indicates ground still safe for the feet, just as *Coma'rum palus'tre* betokens the *unsafe*. A variety, generally very much smaller, and called *Ca'rex Œde'ri*, (E. B. xxv. 1773.) is very common in low wet fields, on the edges of the drains that are cut in them, and upon moors. The fruits are smaller and fewer, and the heads are more crowded.

62. *Ca'rex dis'tans.*—Marshes, wet fields, waste places, and woods, both wet and dry; common. Fl. June, July.

The variety in the habitat is accompanied by considerable diversity of aspect. Hence there are in books no less than half-a-dozen names for this plant, viz.:—*Ca'rex dis'tans*, (E. B. xviii. 1234.) applied to the normal form; *Ca'rex ful'va*, (xviii. 1295.) to one with stems only 12—15 inches high, and ovate and angular fruit; *Ca'rex biner'vis*, (xviii. 1235.) to a tall form, often 4 feet high, the fruit with two prominent green ribs near the margin; *Ca'rex læviga'ta*, (xx. 1387.) also very tall, with the fruit ovate, triangular, and very acuminate; *Ca'rex speirosta'chya*, (Supp. ii. 2770.) resembling *ful'va;* and *Ca'rex depaupera'ta*, (xvi. 1098; Curtis, ii. 432.) a rare variety in which the spikelets are exceedingly few.

63. *Ca'rex puncta'ta.*—Sea-coasts; very rare, and reported only from the west. Fl. summer.

64. *Ca'rex panice'a.*—Marshy places; low, wet meadows, and damp waysides. Common. Fl. May, June.

E. B. xxi. 1505.

Includes, according to Mr. Bentham, *Ca'rex Mielichofe'ri*, E. B. xxxii. 2293, and *Ca'rex phæosta'chya*, E. B. Supp. ii. 2731.

65. *Ca'rex capilla'ris.*—Mountains in the Highlands of Scotland; common: also in Teesdale. Fl. July, August.

E. B. xxix. 2069.

66. *Ca'rex limo'sa.*—Bogs and wet moors; common, except in the south of England. Brookhouse-moss, near Congleton, abundant. Fl. May, June.

E. B. xxix. 2043.

Includes, according to Mr. Bentham, *Ca'rex rariflo'ra*, E. B. xxxv. 2516, a rare plant of the Scotch Highlands; and *Ca'rex irrig'ua*, E. B. Supp. iv. 2895.

67. *Ca'rex glau'ca.*—Moist meadows and moors; common. Fl. May, June.

E. B. xxi. 1506; Baxter, vi. 440 (both as *Ca'rex recur'va.*)

Includes, according to Mr. Bentham, *Ca'rex Michelia'na*, E. B. xxxii. 2236, and *Ca'rex stictocar'pa*, E. B. Supp. ii. 2772. Common in low, wet pastures in Cheshire, and giving them a blueish-gray tinge, whence the farmers speak of the "blue" look of poor land. Such is the land that having yielded its phosphates, requires, in the first place, draining, and subsequently, bone-manure.

68. *Ca'rex sylvat'ica.*—Moist woods and cloughs; abundant everywhere, except in the north of Scotland. Fl. May, June.

E. B. xiv. 995.

69. *Ca'rex strigo'sa.*—Moist woods and cloughs; rare, and in Scotland not found. Fl. May, June.

E. B. xiv. 994.

70. *Ca'rex pen'dula.*—Moist woods and shady places; widely diffused, and tolerably common. Fl. April—June.

Curtis, i. 208; E. B. xxxiii. 2315.

71. *Ca'rex Pseudo-cype'rus.*—Edges of ponds, and in marshy places; widely diffused, but not very common, and in Scotland very rare. Near Manchester, in profusion. Fl. June.

E. B. iv. 242.

This and the preceding are the two handsomest of our native sedges. The great prickly cylinders of unripe fruit, pendulous on hair-like stalks that are often five or six inches long, form a strikingly beautiful ornament of the Manchester pondsides in early summer.

72. *Ca'rex ampulla'cea.*—Pondsides, and by meres and lakes; common. Fl. May, June.

E. B. xi. 780.

73. *Ca'rex vesica'ria.*—Pondsides, and on the borders of lakes and meres; widely scattered, but rather rare. Fl. May, June.

E. B. xi. 779.

74. *Ca'rex paludo'sa.*—Marshy places, and on the borders of water; very common, except in the north of Scotland. Fl. May, June.

Curtis, ii. 281 (as *Ca'rex acu'ta*); E. B. xii. 807.

The stems of this and the other large, coarse, semi-aquatic sedges, are in Cheshire called "sniddel," and used for putting on the cheese-room floors, as they do not give way so soon as the straws of grass or cereals, and seem to allow of better ventilation.

Ca'rex ripa'ria (Curtis, ii. 280; E. B. ix. 579.) is a large state of the *paludo'sa*, with longer female catkins, on longer peduncles, sharper points to the glumes, and more decided points to the fruits.

Ornamental plants for the garden this family can hardly be said to possess. Several, however, occur in stoves and green-houses, as *Cype'rus alternifo'lius*, and the celebrated Papyrus of the Nile. The latter, *Papy'rus antiquo'rum*, is a magnificent plant, throwing up numerous triangular green stems, 5—6 feet high, the thickness of one's finger, and crowned with great compound umbels of little green flowers, the innumerable primary rays 12—15 inches long, and as fine as hair, so that every umbel forms a beautiful half-pendent sphere at least a foot in diameter, and usually very much more. *Cype'rus alternifo'lius*, a native of Madagascar, throws up cylindrical green stems to the height of 2—3 feet, every stem with an interrupted crown of long, grass-like, and half-pendulous leaves that fall over like the ribs of an uncovered umbrella, and convert it into the miniature of a palm-tree, the light-brown flowers showing in little clusters in the midst. A variety of this beautiful plant has the leaves edged with yellowish-white. Ferneries contain, usually in great abundance, the green, densely-tufted, grassy-looking, and weak-stemmed *Scir'pus* or *Isole'pis gra'cilis.*

CLXXXVII. THE PIPEWORT FAMILY.—*Eriocaula'ceæ.*

Herbaceous plants found in marshes or water, with radical tufts of linear and loosely-cellular leaves, and scapes bearing small heads of minute flowers. The structure of the latter is intermediate between that of the Cyperaceæ and the rushes. From the latter they are distinguished by being monœcious; and a membranous tube, formed of the two or three inner segments of the perianth in the male flowers, separates them quite as decidedly from the glumaceous families. The species are numerous, and belong chiefly to America and Australia. One of the American representatives occurs also in Britain, but nowhere else in Europe.

An aquatic, with numerous long white roots that are matted together in dense tufts, and form little floating islands. Leaves 2—3 inches long, forming a dense tuft, linear, tapering to a fine point, and internally cellular. Scape from the centre of the tuft of leaves, 3—12 inches high, downy, erect, with about seven longitudinal angles, and terminating in a convex head of minute whitish or lead-coloured and downy blossoms, the whole resembling a little double white daisy, but scarcely half an inch across. Central flowers chiefly male, the others chiefly female; perianth mostly 4-cleft, with bracts outside; stamens four, the anthers prominent and dark violet.

COMMON PIPEWORT.

HABITATS AND DISTRIBUTION.

COMMON PIPEWORT—*Eriocau'lon septangula're.*

Lakes in the Isle of Skye, Coll, Tyri, and others of the Hebrides; abundant. In Skye, especially in Loch-na-Caplish; and in Coll, especially about Breacacha. Also in the lakes of Connemara, west of Ireland. Fl. September.

Curtis, iii. 549; E. B. xi. 733; Baxter, vi. 465.

Though curious and pretty, these plants do not appear in cultivation, unless occasionally in Botanic Gardens, where exotic *Eriocau'lons* are now and then seen, as *E. decangula're* (Bot. Mag. lix. 3126.)

Nearly allied to them are the *Restia'ceæ* of the southern hemisphere, herbaceous and under-shrubby plants, often with tough and wiry stems. They are distinguished by their usually spicate inflorescence, and by the absence of the membranous tube from the flowers. *Res'tio* and *Willdeno'via* are good examples. A link between these two families and the higher types of Endogens, touching the latter in the *Commelyna'ceæ*, is found in a little group of tropical plants called *Xyrida'ceæ*, the trimerous and petaloid flowers of which are often gaily-coloured, though the herbage is sedgy, as in the yellow-blossomed *Xy'ris opercula'ta* (xxix. 1158.)

INTERMEDIATE FAMILIES.

CLXXXVIII. THE TAMUS FAMILY.—*Dioscorea'ceæ.*

Climbing plants, nearly peculiar to the tropics, and in structure intermediate between Exogens and Endogens, the characters of which equally pertain to them. The root-stocks are very large, and either tuberous or knotty and wooded; the stems slender, usually annual, and generally of great length; the leaves broad and net-veined, and with distinct petioles, that are often articulated to the stem; the flowers invariably small and unisexual, generally borne in racemes that spring from the axils, and with a regular and six-cleft perianth; the males with six stamens, and the females with an inferior ovary.

One species British.

Root-stock fleshy, deep in the earth, and enduring for many years. Stems annual, slender, and twining to the height of 8 or 9 feet. Leaves alternate, petiolate, variously cordate, 2—4 inches long and broad, acutely pointed, quite entire, glabrous, and of a bright and lucid green. Flowers minute, greenish-yellow, diœcious, and borne in slender racemes; those of the female plant shorter than the leaves, and becoming clusters of scarlet and viscid berries that are considerably larger than peas, and rudely triangular, like a coco-nut in the husk. COMMON TAMUS.

HABITATS AND DISTRIBUTION.

COMMON TAMUS—*Ta'mus commu'nis.*

Woods, thickets, cloughs, shady hedges, and borders of fields. In England widely diffused, and common, especially in the southern counties; in Scotland and Ireland not found. Fl. June, July. Berries in September and October.

E. B. ii. 91; Baxter, iv. 291.

No plant that our island produces is more elegant than the common *Ta'mus*, or more pleasing to watch in its development. The young shoots come up tenderly in April and May, and make so little show that it is difficult to detect them. As the season advances, they ascend bushes and small trees, till far above our heads, many often wreathing together, like those of honeysuckle, while others swing in festoons, or blend in such a way, as they climb upwards, as to make the plant seem a descending stream of shining foliage, the very gloss of which has a cool and refreshing effect. The racemes of male flowers are considerably *longer* than the leaves, and remarkably light and delicate. Those of the female plant are always *shorter*, and the leaves are usually smaller, so that by this circumstance alone the sexes may be unmistakeably distinguished. No plant furnishes so many varieties of the cordate leaf, some being long and narrow, others broad and rounded, yet none unconformable to the primitive type. The petioles supply beautiful ribbon-like spiral vessels, which, when properly prepared, become fine objects for the polariscope. When the berries are ripe, they hang together like little grapes; the foliage turns, at the same time, to a tawny-yellow, and if it shrivels, it is only to bring out so much the better the shining scarlet of the abundant and bead-like fruit.

In greenhouses there are *Diosco'reas*, and an extraordinary plant called the "elephant's-foot," *Testudina'ria elephan'tipes*, the surface of the huge and superterraneous tuber divided into compartments like those of the shell of a tortoise. The stems are slender and annual, and clothed with small green leaves. The "yam," so valuable in tropical countries as an article of food, is the tuber of the *Diosco'rea sati'va*, occasionally tried for the same purpose in England. *Pylogy'ne sua'vis* is a free-growing trailer of very elegant habit, and producing myriads of inconspicuous but powerfully fragrant blossoms.

CLXXXIX. THE TRUE-LOVE FAMILY.—*Trillia'ceæ.*

Plants intermediate, like the Tamus-family, between Exogens and Endogens, having the netted-veined, though not articulated, leaves of the former, and the flowers and embryo of the latter, and proximately characterised by their simple and erect herbaceous stems, seldom rising more than a foot above the ground, and large, terminal, solitary, and bisexual flowers. The leaves are generally very few, and produced in a single whorl near the summit of the stem; the perianth is normally trimerous, consisting of distinct calyx and corolla, with six or nine stamens, and a solitary ovary. After the manner of *Maian'themum* among the Liliaceæ, and of similar exceptional forms in other families with trimerous flowers, there are examples, however, of the parts being developed in *fours*. The species, which number about thirty, grow in the woods and thickets of the temperate parts of the northern hemisphere, and are remarkable for the singularity, and often for the gaiety of their appearance.

One occurs in Britain.

Stem 9—15 inches high, perfectly simple, and naked except at the summit, where there is a whorl of large, broadly ovate, sessile, and shining leaves, usually four in number, sometimes 5, 6, 7, or even 8, and in full-grown plants 2—3 inches long. In the midst of the leaves, elevated on a peduncle, rises a solitary green flower, the parts of which are in fours, or occasionally in fives. The outer pieces, standing as calyx, are lanceolate and about an inch long; the petals are about the same length, but very much narrower, and with a yellowish cast, both sets spreading widely, and the sepals usually more or less recurved. Stamens eight, their filaments slender, the anthers long, linear, and yellowish. Ovary four-celled, (five-celled when the flowers are pentamerous) with as many distinct styles, and ripening into a violet-coloured berry. TRUE-LOVE.

HABITATS AND DISTRIBUTION.

TRUE-LOVE—*Pa'ris quadrifo'lia.*

Damp woods, generally half-concealed among taller plants, and in other modest retreats among the trees. Widely dispersed, and usually plentiful where it occurs, but not a very common plant. Yorkshire and Cheshire, abundant. Fl. May, June.

E. B. i. 7; Baxter, i. 6.

In gardens there are many species of the pretty North American genus *Tril'lium.* The leaves grow in a whorl of three, and are very various in length and width; the large and solitary flower is either white or of some reddish or purplish colour, and either peduncled, like that of the *Pa'ris*, or totally destitute of stalk, as in the curious *Tril'lium ses'sile.* (Bot. Mag. i. 40.) The leaves of this are blotched with white. *Tril'lium erec'tum* is fragrant, and like the *erythrocar'pum*, (lvii. 3002.) which is a very handsome species, presents a beautiful combination of colours in the deep-hued ovary and yellow anthers.

CXC. THE SMILAX FAMILY.—*Smila'ceæ.*

Herbaceous and under-shrubby plants, in some cases manifesting a tendency to climb; here and there prickly; and occasionally with tuberous roots. In many points they approach the Asparagus section of the *Liliaceæ*, differing however in the possession of *quasi*-exogenous stems and net-veined leaves. They also in some points resemble the Tamus-family, from which they are distinguished by having a superior ovary. The leaves are simple and undivided, usually ovate or narrow, pointed, and strongly ribbed; the flowers are small and insignificant, not unlike those of the *Ta'mus*, and also resembling those of the *Menisperma'ceæ*, to which latter family these plants again bear some relation. Being endogenous in respect of the inflorescence, the perianth is hexamerous; the sepals and petals correspond in colour and texture, and enclose six stamens and a solitary and 3-celled ovary, the latter surmounted by as many stigmas, and ripening into a roundish berry. The species, to the number of 120 or more, are widely distributed, predominating in the temperate and tropical parts of Asia and America. They are celebrated as the source of sarsaparilla, obtained from the roots, and in English gardens and greenhouses are not uncommon as curiosities, those cultivated belonging chiefly to the typical genus *Smi'lax.* The best sarsaparilla is yielded by the *S. officina'lis* of Jamaica, and the *S. med'ica* of Vera Cruz. *Smi'lax as'pera* and *excel'sa* are European. In *Smi'lax peduncula'ris* the flowers are borne in axillary umbels like those of ivy.

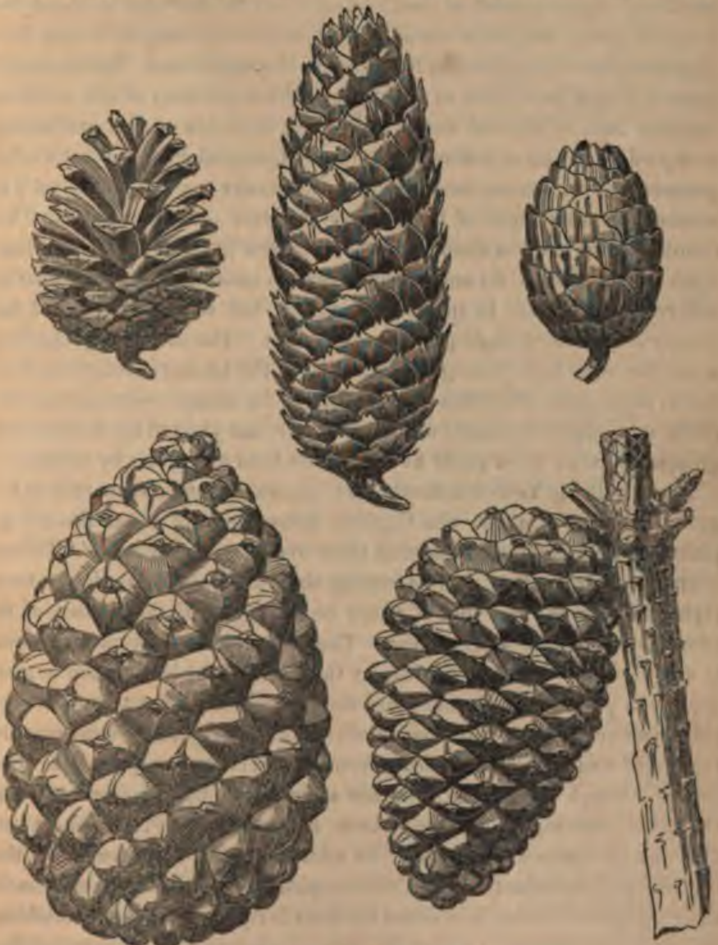
CXCI. THE LAPAGERIA FAMILY.—*Philesia'ceæ.*

Beautiful climbing plants from southern Chili, two or three of which occur in greenhouses. Like the *Smila'ceæ*, they have a zone of wood below the bark, and a central pith; the leaves also resemble those of Exogens in being net-veined, but in other respects the structure is that of Endogens. The species best known is the *Lapage'ria ro'sea*, one of the most captivating plants in nature, and, fortunately, one of the easiest to manage. The stems twine and climb to a considerable height, and may be led, if we please, like those of a vine. The leaves are alternate, ovate, pointed, 3—4 inches long, dark green, and in texture leathery. The flowers are formed something like those of a tulip, and are similar in size, but contracted at the base, so as to form a narrow bell, and of the most exquisite scarlet rose-colour. The sepals and petals are alike in texture, thick and waxen, and protect six large stamens with linear anthers, and a solitary and superior ovary with a long and club-shaped style, all of which parts are concealed within the bell. The flowers are axillary and pendulous, and being produced in great abundance, there is nothing in the greenhouse that presents a more striking appearance. Trained over an inverted cone of wire, the rosy bells hang down upon every side; they last not only for a long time, individually, but are renewed for many weeks. A white variety is also in cultivation.

Phile'sia buxifo'lia is not unlike the *Lapage'ria* in respect of flowers, but the leaves are very narrow. This plant is rather rare.

CXCII. THE FIR-TREE FAMILY.—*Conif'eræ* or *Pina'ceæ.*

If the Palm-trees are the aristocracy of the tropics, no less are the Coniferæ the patricians of cold and temperate latitudes. When at the acmè of their development, they present some of the finest objects of living nature, and even the smallest kinds have a rich and commanding aspect. The number of species is inconsiderable, probably not over 200, but this is forgotten in the contemplation of their vast and imposing abundance, and in the prodigious bulk and the immense altitude attained by individuals. Sixty to eighty feet is quite a common elevation; many kinds grow twice as tall; the pines of North-west America rise frequently to the height of two hundred and fifty feet; and the largest *Wellingtonias* of California, to the almost incredible height of four hundred feet, with a thickness of nearly forty feet at the height of a man from the ground! That is to say, they are nearly as large round as the tube of the railway bridge over the Menai Straits, and fifty feet taller than the topmost point of St. Paul's Cathedral. In the Crystal Palace at Sydenham, there stands, as most people are now aware, an actual specimen of the *Wellingtonia*, consisting of a portion of the bark of a tree that was purposely stripped of it, and which has been rebuilt into the exact position it held while growing. The diameter of the



Figs. 204 to 208. Various cones.

Scotch Fir (*Pinus sylvestris.*) Norway Spruce (*Abies excelsa.*) Larch (*Larix Europæa.*)
Stone Pine (*Pinus Pinea.*) Cluster Pine (*Pinus Pinaster.*)

base is thirty-one feet, and, on going inside, it seems the chimney of some great factory.

On a par with these great dimensions are the longevity and the long-sustained vigour of most of the Conifers. The ordinary age is one or two hundred years, and there seems no reason to doubt that the oldest *Wellingtonias* have been growing for fully five thousand years. No trees again exceed or approach them in multitude. Great portions of the northern regions, both of the old world and of the new, are almost exclusively occupied by forests of different species of *Abies* and *Pinus;* the traveller pursues his way among them for days and weeks together, without witnessing any abatement of the mighty produce. In temperate and hot countries they are less abundant; there are few however, which, at least upon the mountains, do not possess a certain number of representatives, different, it may be, in species and genus, but sufficient to attest the grandeur and the wide dispersion of the race. The uses of the Conifers are not inferior to their magnificent aspect. The timber is known as deal, cedar, and larch; the trunks serve as masts for ships; resin, turpentine, pitch, and other substances of similar nature are yielded by them in the greatest plenty; even seeds fit for human food are given by many.

Along with the Yew-tree family, the *Cycada'ceæ*, and an inconsiderable group called *Gneta'ceæ*, the Conifers differ from all other flowering-plants, as before stated, in having their ovules perfectly *naked*. This of course is only another way of saying that the flowers are destitute of style and stigma, and that if there be anything of the nature of an ovary, it cannot be a *closed* one. The place of the last-named organ is supplied by carpellary scales, in the axils of which lie the ovules, usually in pairs, though sometimes solitary or more than two; and outside these are large firm bracts which, as the seed ripens, become greatly thickened and increased in size, eventually serving as a pericarp. The ovules, though naked, are thus *not unprotected*, but merely devoid of the usual coverings,—a circumstance, nevertheless, of the highest importance in vegetable structure. In addition to this great feature of the apparatus of reproduction, the Conifers possess remarkable characters in their stems and leaves; and when the fruit is ripe, we see a more striking one than any before. One of the chief of the anatomical peculiarities consists in the woody tissue being marked with circular disks that, under the microscope, present a very varied appearance in the different species.

Two principal tribes are distinguished,—one represented by the cedar, pine, and fir; the other by the cypress and the juniper. In both the stem is much branched, and the wood resinous: in both the leaves are small, narrow, and usually evergreen, often lasting several years; in both the flowers are very incomplete, unisexual, often diœcious, and individually minute, yet in many cases attractive from being aggregated in large clusters. The technical difference between the two tribes lies in the true Conifers, called *Abietineæ*, having the pollen-grains oval and curved, and the ovules inverted; while the others, called *Cupressineæ*, have spheroidal pollen and *erect* ovules. Practically they may be distinguished by their branches, foliage, and fruit.

I.—ABIETINEÆ.

The true Conifers are nearly all of lofty stature and pyramidal form, and are usually furnished with regularly whorled branches that extend from near the base of the stem to the summit. The leaves are generally needle-shaped, and several inches long, though sometimes much less, and occasionally lanceolate and flat. The male flowers generally grow in dense clusters of a yellowish or reddish orange-colour, surrounding the twigs, and with tufts of leaves above them, so as to present the figure of a little pine-apple, though occasionally, as in the larch, inconspicuous and devoid of leaves. The female flowers also grow in clusters, lying two together in the axils of scales that are closely imbricated round a short axis, and which, as in the larch, are often of a delicate colour and almost petaloid, the aggregate giving the promise and incipient form of the well-known production called the "fir-cone." The cone, when fully ripe, is in shape and size greatly diversified, but always presents outlines of the greatest symmetry and beauty, and is unquestionably one of the most finished works of nature. The many and regular ranks of ascending spirals, and the exquisitely tesselated surface while still unbroken, have their analogue only in certain tropical sea-shells, and we can well understand why art should have adopted it for some of her most tasteful and popular designs. When the cone opens, the true nature of its composition becomes evident, every scale as it recedes from the axis, liberating a couple of seeds from the inner base, and being thereby proved to be one of the original bracts of the inflorescence, immensely thickened, hardened, and enlarged. The seeds, which shake out freely, are often provided with a membranous wing, and when sown in the earth, unfold many cotyledons. The flowers appear chiefly in May and June; the pollen is very copious, and if the boughs be slightly shaken, descends in showers; the cones take two or more years to ripen, so that several seasons are in early summer represented on a single tree, and though sometimes barely an inch in length, and with scales no thicker than paper, they are sometimes so large and solid as to weigh several pounds.

II.—CUPRESSINEÆ.

The Cupressineæ, as a whole, are much smaller plants than the *Abietineæ*, and many are mere shrubs; their branches are never disposed in regular whorls; and the leaves are often minute, scale-like, and closely pressed against the surface of the branches and twigs. A considerable difference exists also in the fruit, which, instead of being a true cone, is a "galbulus," and in the juniper becomes succulent and berry-like. The ovules, as said above, are *erect*, and sometimes, as in *Cupressus*, more than two. The ready character of the "galbulus" is the very small number of the scales composing it, their extremely broad, thickened, and angular extremities, and the generally globular form of the entire mass, which is also much inferior in size to the majority of true cones. The flowers are always insignificant, and though aggregated in the female plants, they never present such a conspicuous appearance as in the *Abietineæ*. Judged by their external characters, some of the species would never be thought to be Conifers; and as a whole, they have very little general likeness to pines and firs, with which, however, their minute structure requires them to be in every case associated.

One species of each tribe is indigenous to the British Islands.

1. An evergreen tree, of considerable size and stature, the trunk usually simple, sometimes forked, branched chiefly at the upper part, and with a rather obtuse crown of dark-hued foliage. Leaves needle-shaped, 2—3 long, and growing in couples. Cones 2 inches long, and when ripe, with their thick brown scales curved widely outwards. Bark reddish. Flowers monœcious. SCOTCH FIR.

2. A low evergreen shrub, sometimes prostrate on the ground, sometimes erect, the principal branches 2—4 feet long, and the twigs innumerable. Leaves linear, about half an inch in length, whorled in threes, extremely numerous, and prickly at the points. Flowers axillary, minute, and usually diœcious. Fruit globular and dark-purple, resembling a small black-currant, and very abundant. COMMON JUNIPER.

HABITATS AND DISTRIBUTION.

1. SCOTCH FIR—*Pi´nus sylves´tris.*

Mountains and woods in the Scotch Highlands, truly indigenous; and long naturalised in many parts of England. Universal also in parks and plantations. Fl. early summer.

E. B. xxxv. 2460; Baxter, v. 389.

The finest of the Highland pine-woods are probably those at Invercauld in Invernesshire, and at Gordon Castle, Aberdeenshire. English scenery also has a character frequently given to it by the predominance of this noble tree, which, with the Larch and the Norway Spruce, covers vast expanses of hill and mountain in North Yorkshire. Well grown individuals are 60—100 feet high. The cellular bark developes abundantly, and forms a false cork, which comes off in scales, separating like shale or shell-lac. The cones ripen in November, or about 18 months after the period of flowering.

2. COMMON JUNIPER—*Junip'erus commu'nis.*

Dry and barren hills and heathy downs; widely dispersed, but less frequent in the south than in the north. Ormeshead, perfectly procumbent, the unceasing breeze from the sea not permitting the stems to rise, and the roots large, and of great age. Fl. May.

E. B. xvi. 1100.

The "dwarf Juniper," or *Junip'erus na'na,* (E. B. Supp. ii. 2743.) differs only in being more thoroughly and uniformly procumbent, and in having shorter and less pungent leaves. Chiefly a highland or subalpine plant.

Were the coniferous and other trees now growing in Great Britain to be counted, it is probable that the number of the former would equal that of all other kinds put together. The explanation of this enormous aggregate is found in the adaptedness of many species of Conifers for noble and striking effects in landscape; in the fitness of others for wastes and wildernesses where broad-leaved trees will not succeed; and in the value of every kind, without exception, for the ornamentation of parks and pleasure-grounds,—to say nothing of their final service in yielding timber. Of the Cedar-of-Lebanon alone, it is certain that there are very many more individuals now standing in Britain than are to be found in the whole extent of Palestine, and probably there are thousands more *Wellingtonias* than are alive in their native groves in California. Judiciously mingled with broad-leaved and deciduous trees, the conifers give the finest possible contrasts and harmonies, alike in the peculiarities of their physiognomy and in their deep-toned colours; and planted singly upon lawns, with ample space to extend their branches, never fail, however diminutive, to give a classic finish to the scene. Masses all of one kind are monotonous no doubt, but even these have a peculiar grandeur, and in the case of the deciduous larch, the effect in spring is rich and beautiful in the highest degree. For permanently pleasing influence it is best however that Conifers be associated with a variety of other trees,—a necessity felt even more strongly when we enter a wood formed of pines or firs alone. For this is not like a forest of oaks. The pine-wood, though it be but a small one, produces, if we penetrate far, a solemn and almost mournful impression. The endless ranges of tall bare poles give it the air of a city that has been forsaken; the green light that fills a forest of oaks, and supplies the sense of life and freshness, is here unknown; even the ground, elsewhere covered with moss and wild-flowers, is in the pine-wood usually strewed only with dead brown needles and decaying cones. Nothing ever enlivens it. Spring, in the pine-wood, has no sweet prologue of early primrose; nor has summer any gala, nor autumn any chaplet of scarlet berries. Whatever be the season, and whichever way we turn, in the pine-wood we are impressed, more than anywhere else in living nature, with the idea of *unchangeableness;* according to our mood, it seems a place from which life has passed away, or which is not subject to life and death,—in either case the influence is a subduing one, though in a little while, like that of the sea, it brings enthusiasm and noble thoughts. The more so from the sound of the wind among the tops, which is not that of the ordinary broad-leaf forest, but one peculiar to the pine-wood. More than that of any other trees, the murmuring of the pines carries us away to the shores of the sea, seeming not so much their own, as a far-reaching and immortal echo. No wonder that to those who have lived much near the sea, or who have been accustomed to muse upon unfrequented shores, with little other company than that of their own souls, going thither, not like Achilles, for assuagement of wrath, but for new life,—no wonder that to such the "music of the pines" is as one's language heard unexpectedly in a foreign land. Unchangeableness, with rare exceptions, is one of the strong and remarkable characters of this noble race, and though felt most powerfully when numbers are massed together, it is in many particulars quite as striking in individuals. It makes itself felt in the permanence of their hue. Other trees, in a thousand kinds, are *evergreen*, yet none are evergreen as these are. Only in spring and early summer, at the time of the flowing of their annual tide of life, is the colour relieved, and then only at the extremities of the branches, where the new growth appears either as a light and grassy tuft, or shoots out in a beautiful twofold spray, flat and horizontally, as a swimmer stretches his hands for the onward stroke. In autumn the sombre foliage contrasts with the gay hues of the maples, not as that of laurels and hollies, but after the manner of ancient temples that check our view of a tinted sunset; later again, in the deep hush of the snow, when most other trees are converted into white miracles of frost and crystal, the pines still maintain their dark indifference; or if partially overpowered, they remind us, in the distance, of the ermine of the Alps, where branches are represented by whole forests. As a part of their unchangeableness, mark too the *independence* of the Conifers. The most uncompromising of trees, they seldom accept impress from surrounding circumstances, but live from first to last, in a proud consistency. Though planted in the most romantic and broken glen, where other trees lock their branches, and live in association, these never stoop, or lean, or intermingle. The boughs never bend to the river-bank, nor incline over the waterfall or the fountain;—always erect, from base to topmost pinnacle, they preserve their stateliness under every condition and every trial, and in earliest youth and extremest age alike present that matchless symmetry of contour which renders the name of pine-tree another term for illustrious beauty and self-reliance. Of course it is only in extensive and continental or natural forests that these striking characteristics of the pine-*wood* are to be perceived, or at least in their fullness. But they are felt very sensibly if we will only go into the heart of one of those great platoons of firs upon the hill-sides in our own country, under the lee of which we generally see a farmstead; and even in the plantations so common upon the margins of country-parks, and in spaces of land upon large estates that are unsuited for pasture or tillage, but in which Conifers grow to perfection. In these, a few patches of gray-green moss, some prostrate brambles, and here and there a tuft of fern, constitute, very generally, the only other vegetation; even the ivy that clambers up the trees, has no friend in the pines, nor in England, the mistletoe.

The principal Coniferæ planted in Britain belong to the genera *Pinus* and *Abies*. In these are comprised all the species ordinarily seen that are of any magnitude, excepting the larch and the cedar, each of which belongs to a separate genus. The generic differences lie in the cones and in the foliage, but there is usually also a marked distinction in the profile and the physiognomy. The species of *Abies* alone are properly "fir-trees," though the name of "fir" is also applied to the native *Pinus sylves'tris;* and the species of *Pinus* are alone genuine "pine-trees," though the name of "pine" is similarly applied to very different ones. All the species of both genera are evergreen.

1. Pine-trees (genus *Pinus.)* These are mostly flat-headed trees. The leaves are needle-shaped, several inches long, and grow two, three, or five together, surrounded at the base by brownish sheaths. The cones are produced either singly, or in spreading whorls, and have their scales woody, and much thickened at the extremity. The young shoots are perpendicular to the ground, standing up like long green fingers, whatever the angle of the branches with the trunk. After the common Scotch-fir, above described, perhaps the most frequent is the cluster-pine (*Pinus Pinas'ter*) a very handsome tree, remarkable for its fine masses of clustered foliage, which are the more conspicuous from portions of the branches being bare of leaves, owing to the fall from these parts of staminiferous flowers that once encircled them. The leaves are 6—8 inches long, and the cones grow in elegant inverted whorls. In age it is apt to become naked and unsightly below, but the summit remains permanently picturesque, and hence this tree is a favourite subject with Roman and Florentine painters, in whose landscapes it appears frequently. The cluster-pine is naturalised abundantly, along with the Scotch-fir, upon the dry and sandy soil of Barmouth, and on the turfy heath and bogs between Christchurch and Poole, where it propagates itself by seed every year. Besides the *Pinas'ter*, there are the common stone-pine, *Pinus Pinea;* the Swiss stone-pine, *Pinus Cem'bra;* the Weymouth pine, *Pinus Stro'bus;* the Austrian, *Pinus Austri'aca;* the *P. Pumil'io, Tau'rica, murica'ta*, and many more. One of the best is the Corsican pine, *Pinus Lari'cio*, distinguished by its candelabrum form, long tapering buds, and long and intensely green leaves. *Pinus insig'nis* has leaves of an extremely rich and beautiful grass-green, and produced three in a sheath. The common stone-pine, *Pinus Pinea*, is known by its immense and ovoid cones, covered with facets like those of the pine-apple, (which is named from it) and resembling, while unopened, some splendid carving in wood.

2. Fir-trees (genus *Abies.)* Unlike the preceding, in figure these are conical or steeple-shaped; the leaves are short, *solitary*, and more or less two-ranked; the cones are usually pendent, solitary, and terminal, their scales thin and paper-like, without any thickening at the extremity, but undulated instead; and the young shoots spread out horizontally. When mature, the branches are thin, very much spread out, and with a peculiarly frondose character, as if modelled on the type of some huge fern. Foremost among them is the glorious Norway spruce, *Abies excel'sa*, the tree that yields "white deal," and the tallest produced in Europe, the

full stature being no less than 150 feet. When old, the lower branches often drop off; those next above them then become half-pendulous, and frequently almost touch the ground, giving the tree a peculiarly fine pyramidal appearance, and the whole being of a delightful and vivid green, whether young or old, it is one of the most charming of its race. The cones, which are cylindrical, and grow invertedly on the points of the upper branches, attain a length of 3—7 inches, and a diameter of nearly two; the seeds are small, and have wings an inch in length. Squirrels are very fond of them, and generally strip all away by the spring. The Black Spruce, *A'bies nigra*, the fir of the Arctic regions, a tree often with many minarets; the warty fir, *A'bies Menzies'ii;* the Douglas fir, *A'bies Douglas'ii*, deep green, like the yew, and scenting the air after rain; the Hemlock Spruce, *A'bies Canaden'sis*, with cones less than an inch long, and so called from its exquisitely light appearance, which suggests the idea of the foliage of Conium ;—and several others, are also common and greatly valued ; together with the magnificent Silver-firs, which are by some made into a distinct genus, under the name of *Pi'cea*. The latter are distinguished by their leaves having two silvery lines on the under-surface, and by the cones being always erect. After the common Silver-fir, *Pi'cea pectina'ta*, the most admired are the Cephalonian, *Pi'cea Cephalon'ica ;* the Balm-of-Gilead fir, *Pi'cea balsa'mea;* the *Nordmannia'na*, a most beautiful tree, especially in spring ; and the *Pin'sapo*, the last usually very small, and distinguished by the cylindrical leaves, disposed all round the twigs, and by the young topmost branches radiating like the limbs of a star-fish.

3. The Larch (*La'rix Europæ'a.*) Now existing with us probably in millions, this noble tree was, in 1629, a curiosity! In stature it is equal to the Scotch-fir, but of widely-different aspect, and singularly graceful. The branches begin from near the ground, and bend downward in elegant concaves, producing innumerable slender twigs, which are thickly covered with little tufts of light-green leaves about an inch in length, and that while young resemble wheat-sheaves. The clusters of male flowers appear while the tree is still leafless, and are about half an inch long, very numerous, solitary, and sessile along the twigs ; the females grow in very beautiful rose-coloured cones, which afterwards become brown, the scales thin, blunt, and remaining erect. In one variety the stem is continued beyond the cone to the length of two or three inches. The leaves fall in autumn, so that in winter the tree is naked.

4. The Cedar *(Ce'drus Liba'ni.)* This, the most famous of the Conifers, dark, rich, massive, and majestic, is at once known by its branches spreading horizontally, so as to form broad and dark-green floors, upon which the innumerable cones stand erect. The latter are 3—6 inches long, the scales extremely thin, and closely overlaid, so that the cone ordinarily presents an even surface, with a remarkably flattened extremity. The leaves are very short, and grow in tufts like those of the larch, but instead of being flat and deciduous, as in the last-named tree, they are four-sided and evergreen.

Of other Conifers in Britain, though there are tens of thousands of individuals, none have yet had time to attain dimensions of importance. They give promise, nevertheless, of their future grandeur, and in another century or two will no doubt be marvels of beauty. Such are the Deodar, the *Arauca'ria*, the *Wellingto'nia*, and the "deciduous cedar," Taxo'dium *dis'tichum*, with others of more recent introduction, such as the *Cryptome'ria Japon'ica* (a tree that does badly on lime, but excellently on new-red-sandstone) and the Japanese Umbrella-pine, *Sciadopi'tys verticilla'ta*, one of the finest of eastern evergreens. Some of these are at present rare, but Conifers generally are common enough, and there are few districts in which a good Pinetum is not to be found. The finest in England is at Dropmore, where there is an avenue of nearly 200 Cedars-of-Lebanon!

The Deodar, *Ce'drus Deoda'ra*, is one of the lightest and most airy-looking of trees,—in figure a vegetable fountain, feathered to the ground, where it covers a considerable space, and at the summit tapering to a point, like the larch. The leaves are short, and the colour is a peculiar grayish-green. In respect of soil the Deodar appears to be one of the least particular and most accommodating of Conifers. Hence it succeeds in almost every garden, and will probably become as great a favourite as the larch. Already upon the hills between Coniston and Hawkshead, rejoicing in the mountain-air, it seems to grow as freely as upon its own Himalayahs. There is strong reason to believe that this grand tree is specifically identical with the *Ce'drus Liba'ni*, and connected with it through the *Ce'drus Atlan'tica*, all three being derived from a common stock. For the arguments see "The Natural History Review," January, 1862.

The Araucaria, *Arauca'ria imbrica'ta*,—better distinguished as the "Chili-pine," since there are other species of the genus in cultivation,—is, without question, one of the most curious trees in nature. The trunk is perfectly straight and erect; the branches are disposed in rigid, horizontal whorls of six, seven, or eight, and turn up at the ends; the leaves are broadly lanceolate, pointed, and densely imbricated; while the general appearance of the tree is that of a great crowd of scaly and writhing serpents, captive and seeking to free themselves. This wonderful plant is from Southern Chili, on the western declivities of the Andes, where it attains the height of 150 feet, and is called by the natives the "monkeys' puzzle," no animal of that kind being able to climb it. It was introduced in 1796, and many thousands of fine young trees now exist with us. In the terrible frost of Christmas 1860, when many shrubs and trees that had stood for the previous half-century were destroyed, the Chili-pine, however, was one of the first victims, or if not totally destroyed, was mutilated for life. Some of the specimens killed were 24 feet high. To tell the age of a *growing* Araucaria, count the tiers of branches, and add one-half the number, which will give it pretty nearly. Coal-smoke is more desperately pernicious to this tree than perhaps to any other species of its race. One with another, the Conifers are emphatically trees of the mountain-side, as expressed in their most ancient name;—they are trees also needing pure air, and a clear atmosphere. This last comes of their being emphatically also the *resinous* forest-trees, and hence it is that like other trees which exude much resin, they are the worst of all to plant in towns, where they soon get coated with soot, that no rain can wash away, and die of suffocation.

Of the *Wellingtonia*, the tallest and finest example yet developed in this country is probably one of those at Basing Park, Hampshire. The height is 14 feet, the circumference of the trunk at 6 inches from the ground, nearly a yard, and the circumference of the branches more than 10 yards. Cultivators who would have the *Wellingtonia* grow effectively, should plant it on a mound about 2 feet high. The roots are then preserved from damp, and with a little management the lower branches can be be trained so as to sweep the ground on every side. Cones, to the surprise of many, have already been produced by this tree in England! But the circumstance is not without parallel. Scotch-firs may sometimes be seen smothered with cones, when not more than four feet high, and with the remains of others that were produced three or four years before. In all these cases, including that of the *Wellingtonia*, the cones are untimely and abortive.

The Cypress and Arbor-vitæ in their manifold species, along with the junipers and the Savin, (*Junip'erus Sabi'na*) are generally distinguishable at a glance by their peculiar habit. The former are mostly shaped like the Lombardy-poplar, and in some kinds have their branches disposed in thin green vertical plates; the latter are mostly low and spreading shrubs, with minute and very numerous leaves, and somewhat of the look of a heath. Technically, they are told by their fruit, which in *Junip'erus* is berry-like, in consequence of the scales of the galbulus becoming fleshy; while in the others these parts remain dry. In *Cupres'sus* the scales are one-flowered, and the galbulus is angular; in *Thu'ja*, (comprising the shrubs called *Arbor-vitæ*) the scales are two-flowered, and the galbulus is winged. Junipers may also often be recognised by the very odd appearance which arises from their having *two kinds of leaves*, those on some of the branches being minute and appressed, while upon others they are linear and spreading. This is especially remarkable in the *Junip'erus Chinen'sis*. The strongly-scented evergreen called the American Arbor-vitæ, is *Thu'ja occidenta'lis;* the common flat-branched, is the *Thu'ja* or *Bio'ta orienta'lis;* and the common evergreen cypress, *Cupres'sus sempervi'rens*. The most beautiful of this group, both in colour and form, is the Californian *Thu'ja gigante'a*. The *Bio'ta pen'dula*, *Bio'ta au'rea*, and *Junip'erus recur'va*, which last is fragrant, and droops as if withered, are also very interesting species, as are *Cupres'sus Lawso'ni* and *macrocar'pa*, *Liboce'drus Chilen'sis*, *Thuiop'sis borea'lis*, and many others. Savin is especially useful as giving the charm of wildness in the midst of artistic polish, the habit of growth being procumbent and irregular.

Greenhouse Coniferæ comprise several of great beauty. The most esteemed is the Norfolk-island Pine, *Arauca'ria* or *Altin'gia excel'sa*, one of the grandest trees in nature, and even in the little specimens that adorn our collections, of inexpressible and uncontested queenliness. Every branch resembles an enormous frond of some delicate fern, such as the *Asple'nium Filix-fœm'ina*, and though firm, hangs with a rich and most elegant languor. *Retinispo'ra pisif'era*, perhaps half-hardy, has the margins of its tufts of leaves of a rich yellow colour, making it appear as if every separate bundle of twigs terminated in gold fringe, and giving the plant an aspect truly regal. The little Coniferæ grown in flower-pots for decorating saloons are *Pinus Cem'bra*, *Picea amab'ilis*, *Picea Pin'sapo*, *Abies excel'sa*, and others of the common and hardy kinds.

CXCIII. THE YEW-TREE FAMILY.—*Taxa'ceæ.*

The yew-tree and its immediate allies, to the number of about fifty, in most respects correspond with the Coniferæ. They are distinguished from the latter by the ovules being solitary, and unprotected by hardened scales, and usually by difference of aspect. The stems are branched irregularly; the leaves are usually small, narrow, and evergreen, sometimes dilated and lobed, and in that case fork-veined, indicating the approach of this family to the Ferns; the flowers are very minute, consisting of nothing more than a few small bracts; and with peltate stamens that, at least in *Tax'us*, remind us of the spore-cases of *Equise'ta*. The species are widely distributed, chiefly occupying the milder parts of the world, and are in many cases valued for their hard and beautiful timber, or for their succulent and eatable fruit.

One grows wild in Britain.

A dark and sombre evergreen tree, with a short, thick, and massive trunk, and widely-spreading branches. Leaves very numerous, about an inch in length, narrow-oblong or linear, glabrous and glossy, inserted all round the twigs, but spreading in two opposite ranks, with all the upper surfaces in the same plane, the margins entire, and somewhat revolute. Flowers unisexual and diœcious: those of the male trees forming little oval and yellowish clusters, sessile in the axils of the leaves, and very numerous; those of the females extremely minute, also in leaf-axils, and followed in autumn by crimson fruits half an inch long, and in figure resembling a little acorn, only that the cup is succulent with viscid juice, and the seed considerably shorter. Sometimes the cup is green and undistended, and then the seed projects. COMMON YEW-TREE.

HABITATS AND DISTRIBUTION.

COMMON YEW-TREE—*Tax'us bacca'ta.*

Abundant all over Britain, and no doubt truly indigenous, though many of the oldest examples, such as those in churchyards, were probably planted. Fl. March, April.

E. B. xi. 746; Baxter, iii. 222.

Perhaps the wildest state in which the yew occurs in Britain is that of the dwarfed and wind-wrung specimens that occur commonly on cliffs by the sea, as on the Ormeshead and at Lynmouth, Devon, where pushed by the impaling breeze close against the face of the rock, they are no more than thin bushes, though tough as iron. Those that stand in their shrouds of black, in plantations and hedges, are certainly from the hand of man. In gardens and shrubberies, besides the common form, is very generally seen a variety called the "Irish yew." The branches of this are vertical, like those of the Lombardy-poplar; in height and circumference it is well-proportioned, and not too great, even for a lawn-plant; the leaves are scattered, instead of two-ranked, and the berries are larger and of brighter colour. The leaves of this celebrated tree are *poisonous;* the fruit, however, which is sweetish, may be eaten with safety, and by throstles and blackbirds is largely consumed.

Exotic Taxaceæ are not infrequent in large pleasure-grounds, especially such as are devoted to Coniferæ. *Cephalotax'us Fortu'ni*, from the north of China, a magnificent tree when full grown, has large, deep-green revolute leaves, three or four inches long, and of a silvery hue on the under-surface. *Salisbu'ria adiantifo'lia*, from Japan, has leaves resembling the leaflets of the maiden-hair fern, but 2—3 inches in length and breadth, and of leathery texture. *Podocar'pus* and *Exocar'pus* are very interesting genera from New Holland.

CXCIV. THE CYCAS FAMILY.—*Cycada'ceæ.*

The Cycadaceæ are dry, hard, rigid, under-shrubby, or arborescent plants, remarkable as belonging to a dynasty of vegetation that prevailed long before the existing one came into life, and the relics of which lie concealed in the earth in the condition of fossils. Their relationship is threefold and very peculiar, the structure, in different particulars, being at once that of ferns, of palm-trees, and of conifers. The Palms they agree with in their simple and cylindrical stems, bearing a crown of large leaves upon the summit, and, though usually short and stumpy, rising in the *Cy'cas circina'lis* to the height of thirty feet;—Conifers they resemble in their inflorescence and naked ovules, and also in the microscopical characters of the wood; and Ferns they correspond with in their large and *quasi*-pinnate leaves, generally circinate while young, and which, when they disarticulate from the trunk, (after the manner of those of conifers) leave it strongly marked with the lozenge-shaped scars of their broad and woody petioles. Not many species are known, the total scarcely amounting to fifty, and of these at least a third belong to the genus *Za'mia*. The remainder are comprised in *Cy'cas*, *Di'on*, *Encephalar'tos*, *Macroza'mia*, and *Stange'ria*. They grow chiefly in equinoctial America and Asia, in Madagascar, and at the Cape of Good Hope.

Though of singular appearance, these plants are of little interest except to the botanist, and hence are seldom seen except in large collections. At Kew they are represented in considerable number, and in their great gray-green spinous foliage, and odd cones of inflorescence, form a striking and conspicuous feature of the house containing them. One species is rather frequent, but unfortunately under the mistaken name of "Sago-palm,"—given it on account of the pith of the stem yielding in Japan and the Moluccas a farina like that produced by the true Sago-plant, though much inferior. Other Cycadaceæ are useful in the same respect, either in the contents of the stems or in the seeds. This wrongfully-so-called Sago-palm is the *Cy'cas revolu'ta* of Japan; a species giving a fair idea of the family, though not one of the most remarkable. The stem is conical and nearly cylindrical, yellowish-brown, usually about a foot in height, seven or eight inches in diameter, and marked spirally by the great scars of the fallen leaves, the general appearance being that of a coarse and overgrown pine-apple. On the summit is an evergreen crown of thirty or forty great pinnatifid leaves, reaching a yard on every side, the lobes or pinnules very numerous, linear, several inches long, exceedingly rigid, sharply pointed at the extremity, and somewhat revolute. To see it in bloom is very unusual, and a treat that falls to the lot of few. A specimen that flowered in 1859 in the conservatory at Longford Hall, near Manchester, the seat of John Rylands, Esq., stood at that time fully two feet and a half high, and had a diameter varying from 10 to 12 inches. The number of leaves was 29, many of them several years old, it being the nature of the Cycadaceæ to grow very slowly, and to retain their leaves for many seasons in succession. In the centre of the coronet rose the wonderful cluster of inflorescence, consisting of about 150 woolly stalks the size of a man's hand; and resembling great bird's-claws, branching on either side into a number of slender divisions. At the base of every one of the lower divisions was a beautiful crimson fruit, the size of a plum, but flattened at the sides, and covered, like the stalks, with fine brown wool, soft and delicate as the bloom of a peach, and coming off with the least touch, so as to reveal the rose-hue of the surface more completely. The number of fruits upon every spray was about seven, and the total number considerably over 1000. On cutting one in half, it was found to consist of a thick soft red substance, with a cavity in the centre, in which lay a little bag of watery juice. None of these fruits became properly ripe, the *Cycada'ceæ* being all diœcious, and the plant in question living in celibacy, or without the company of a staminiferous one. Until the flowers appear, it is impossible to tell whether a given plant of any of this family be a male or a female, and hence it was not until the time referred to, when the individual in question was at least fifty years old, that its sex was made apparent. The development of the flowers occupied about four months, and probably resulted from the plant having been somewhat starved, since deficiency of nutriment frequently leads to the production of bloom in plants that are ordinarily slow to fructify. The first appearance of the cluster was that of a child's head, covered with flaxen hair. The flowers of the male plants, both of the Cycas and of the other genera of this family, are produced in cones formed of numerous leafy scales, on the under-surface of which are numerous anthers disposed in fours.

IMPERFECT, OR FLOWERLESS PLANTS.

CLASS III.—CORMOGENS.

CXCV. THE FERN FAMILY.—*Fil'ices.*

The Ferns are to the flowerless plants what amentiferous trees are to other Exogens,—the noblest and foremost of their class in respect of figure, though with fructification less perfectly developed than happens elsewhere. Judged by the fructification, the highest of flowerless plants are perhaps the Mosses. The Ferns, however, are so admirable in their foliage, and in the size and elevation they often attain, that they are universally allowed the principal place, and for practical purposes this is clearly the most proper one. In delicacy and variety they are the *bijouterie* of nature. Though flowers allure by their gaiety of colour and agreeable scents, the ferns attract us quite as powerfully in their elegant and graceful outlines; in their tissues and organisation they are no less tender, and in their sweet and often perennial verdure no less refreshing.

"Flowerless plants," it may be useful to repeat, are those in which the functions performed in Exogens and Endogens by stamens and pistils, are played forth, almost invisibly, by organs which, though analogous to the latter, and strictly representative of them, are constructed on a very much simpler plan, and are so minute as to be discernible only with the microscope. And not always even with the aid of that wonderful instrument. There can be no doubt that in the scheme of vegetable life universally there is a vigorous twofold energy similar to that which in the more complex races is manifested through the stamens and pistils;—still it cannot always be satisfactorily made out, that is to say as expressed in apparatus, and the existence of it is *pro tem* inferred from analogy. The ferns show it plainly enough, as will presently be described;—in the practical, everyday sense of the word, these plants are, nevertheless, like all the families that follow, truly *flowerless*;—in no case have they parts that can be dissected away, and called calyx, corolla, stamen, and stigma. Generally speaking, the flowerless plants are humble in stature; many thousand species are microscopic, and consist only of a few cells; only a portion of them are provided with stem-like and leaf-like organs, and such as they do possess are generally of incomplete structure. The parts directly concerned in the process of reproduction, whatever may be their form, are collectively called the "fructification;" the seeds, which are always impalpably minute, are formed differently from those of flowering-plants; they are destitute of distinct embryo and cotyledons, and are technically termed "spores."

Ferns have distinct roots; frequently a large and thick rhizome or root-stock, which often lies upon the surface of the ground; and elevated from this latter, beautiful foliage, the thin parts of which, on being held between the eye and the light, are found to be traversed by delicate veins. In very many instances, including all the British species, these veins are of the disposition called "forked," the primary veins giving rise to pairs of smaller ones, which move off in lines nearly parallel, but never re-unite, and never interlace with their neighbours. (Fig. 209.) The foliage serves a twofold purpose. It corresponds at once to the *leaves* of flowering-plants, and to their *twigs* and *peduncles*. Every "fern-leaf" or "fern-branch," or whatever else it may be popularly called, is, in reality, the amalgamation into a single body of what in Exogens is distributed into three or four distinct organs, and distinguished by as many different names. Botanists term it a "frond,"—a term intended to signify that it comprises within itself both stalk and leaf, peduncles, and seats of fructification; and this being its true nature, strictly speaking, the term "leaf" should never be applied to a fern-frond, any more than to the petal of a flower. The stalk of the frond is technically termed the "stipes," and though sometimes scarcely developed, is often as long as the green and leafy portion. The continuation of the stipes, bearing the green portion of the frond, and frequently much branched and subdivided, is by another convenient technical usage, termed the "rachis;" when, however, the frond is quite simple and undivided, as in the hart's-tongue, it is best to call this part simply the "midrib." The total length of the frond, from the base of the stipes to the uttermost point of the leafy portion, varies in different species from two or three inches to as many yards. *Dickso'nia antarc'tica*, cultivated in most good ferneries, produces, when in perfection, fronds fully 12 feet long. In the tropics there are glorious species that attain the stature of trees, building up a slender shaft with the bases of their successively-developed fronds, which keep ascending as a crest, higher and higher into the air, after the manner of the crown of a palm-tree, and emulating the palm-leaves in magnitude. A rude and rudimentary pedestal of similar origin is often observable in some of our native *Aspid'iums*, and in the *Osmun'da*. Cut transversely, the section of the stipes presents dark spots and curving lines, somewhat analogous to the rings in the stems of Exogens. In the common brake these are conspicuous, and give the idea of an oak-tree with broad trunk and spreading boughs. They do not afford the distinctive characters that some believe, since the appearances vary both with the vigour of the stipes, and with the part of which the section is made. In attitude the frond is, generally speaking, erect, or with more or less of an incline outwards and backwards; sometimes, however, as in the *Lygo'dium*, the rachis is extremely long and slender, and twines like honeysuckle; while in such as the *Niphob'olus*, it creeps and clings after the manner of ivy, and unless doing so, never fructifies. Many species, such as the *Daval'lia dissec'ta*, have the stipes perfectly erect, while the rachis curves backwards, and the fronds being very numerous, we seem, on looking underneath, to have a crowd of little trees with leafless trunks and umbrageous heads. Shield-ferns, when fully developed, often form an inverted cone, the fronds spreading symmetrically from the crown of the rootstock like the feathers of a shuttlecock. In others again, the long frond bends down to the earth at the extremity, and touching it, takes root, continuing life as a little green arch. This occurs in the *Asple'nium flabellifor'me*.

The green and leafy portion of the frond is either simple and undivided, and then either circular, lanceolate, or arrow-shaped; or, as happens much more frequently, *quasi*-pinnate, or deeply pinnatifid, with a lanceolate or triangular outline; or it is variously and repeatedly branched, the successive divisions again pinnatifid, cleft, and lobed. When *quasi*-pinnate, the primary divisions are called the "pinnules," and their subdivisions the "segments;"—when branched, these terms are applied to the small and ultimate portions, since the latter, in figure and general character, correspond exactly with the pinnules of such as do not branch. Some species, in addition to their usual and regular pinnules and segments, are prone to begin again, new pinnules sprouting at the ends, in a manner altogether quaint and supplementary, ferns growing, as it were, upon ferns. This happens very remarkably in certain varieties of the ostrich-feather type of fern, such as the common shield-fern and the lady-fern, which often have the tips of their pinnules forked like the tail of a fish, and in certain garden varieties most curiously multiplied and fringed, so as to form beautiful tufted sprays and crispy tassels. It occurs also in ferns of the simply-lanceolate form, especially the common hart's-tongue, which in the wild state is very often "bifurcate," and in gardens often bears an immense crest at the extremity. There are few ferns indeed that do not at times assume the bifid condition, sometimes at the tip, sometimes in the pinnules, the tendency to it being no more than might be expected from the forked determination of the veins; and when tassels and "parsley varieties" are produced, it is simply that the forking power is vigorously reasserted. The development of absolutely new plants, such as constantly occur upon the fronds of certain foreign species termed viviparous, is a phenomenon altogether different from that of the formation of tassels, since the former drop off and grow, whereas the tassels are integral portions of the original fern, and possess no independent vital property.

While in the bud state, the fronds of ferns are usually "circinate," that is to say, coiled inwards in such a way as for the tips to lie in the innermost heart of the mass, every pinnule and pinnulet curling inwards in the same manner, the whole forming a compact and flattened spiral, that seems a vegetable ammonite. The spectacle they present when they rise out of the ground in spring, at first nestling in the midst of brown and chaffy scales, and resembling little shaggy and clenched fists,—then gradually opening into soft coils of spongy verdure, and by and bye presenting the figure of a bishop's crozier, or a triple crook, is exceedingly curious and pretty; and associated as it is with the arrival of the early bluebells and the gush of the primroses, becomes to the lover of wild nature no less welcome than it is singular and characteristic. The scales, which appear to be in ferns what hair and down are to other plants, become diffused over the stipes as it elongates, and often also upon the rachis. When detached they are found to be lace-like and semi-

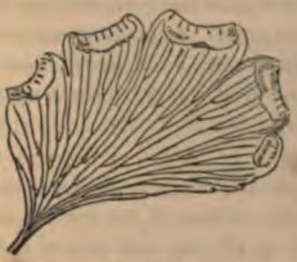


Fig. 209.
Forked veins. Leaf of Maiden-hair Fern (magnified).

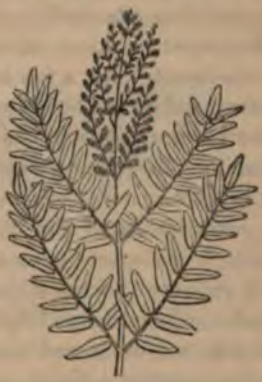


Fig. 210.
Osmunda (miniature).

transparent; and if magnified, and viewed with the polariscope, become objects of remarkable beauty, and often acquire prismatic hues. On the long creeping rockstocks which many ferns send out in all directions, these scales are often quite as abundant as on the stipes, making them resemble caterpillars, while the thickened ends mimic the hairy hoofs or paws of little quadrupeds, as familiarly exemplified in the common hare's-foot fern. Many species are totally destitute of scales, and then the stipes and rachis often resemble ebony in their deep hue and polished surface, as happens in the maiden-hair. Green is the prevailing *colour* of the fronds, though a few charming exotic species, principally comprised in the genus *Gymnogram'ma*, are richly overlaid on the under-surface with a golden or silvery powder, which is apt to rub off like the feather-dust from a butterfly's wing. In texture they are usually dry, rarely somewhat succulent, often disposed to be leathery, and sometimes quite translucent. Not a few have the power of repelling water from the surface, and cannot be wetted, as expressed in the name *Adian'tum*. The duration is quite as variable; some kinds being evergreen, while the fronds of others are destroyed by the first frost. Scarcely any are annual as to their roots.

The *fructification* of the ferns is in the highest degree curious. Generally, it is disposed upon the under-surface of the fronds, in the shape of yellow or brownish spangles, or of long and narrow bars, or as a slender and continuous braid along the margin. Sometimes it forms an elaborate net-work, and occasionally a coating of spongy matter, resembling a plaster. These spangles, bars, and other developments, whatever their figure and position, are termed the *sori*. They are chiefly abundant at the upper part of the frond, and are sometimes quite confined to it, and in some species, as the hard-fern, and the exotic *Olfer'sia cervi'na*, they occupy only a few of the fronds. The barren and fertile fronds are then usually of different figure, and the fern is called "dimorphous." The fronds of a given fern-root do not in any case, *all* produce sori, any more than every branch of a rose-bush produces roses; fertile or "soriferous" fronds are always intermingled with sterile fronds. Nor are fertile fronds to be obtained in perfection except at specific seasons. From the close of summer till the end of autumn is the best time for the greater portion; those, however, of the evergreen species, many of which quit life with reluctance, may be obtained in good condition even in spring. Ferns that have their sori disposed in the ways above-mentioned are termed "dorsiferous," *i.e.*, as carrying their seed, after the manner of gipsies, upon their backs.

When examined with a microscope, the sori of these "dorsiferous" ferns are found to consist of multitudes of little globular boxes, every box with a short stalk, and girt with an elastic ring, which latter, seeking to straighten itself, in due time tears the box open. The boxes are termed the "thecæ;" the contents liberated when they burst, are the "spores,"—bodies of exquisite minuteness, and produced in incalculable quantities, the little spangles, like the "fairies' money" the poet has aptly likened them to, literally "turning to dust." Viewed under the microscope, the thecæ may be watched bursting, and the spores jumping out, the whole scene being alive with tiny movement. And so vast are both in numbers, that if a perfectly ripe and well-covered frond be laid between papers to dry, a perfect image of it will be deposited in brown powder. While young, the sori are covered by a very delicate membranous lid, called the "indusium," which cracks or detaches itself, in the different genera, in many different ways, and furnishes excellent discriminating marks for them. Occasionally, as in the common golden-dotted polypody of the hedgebanks, an indusium is not developed, and the sori then appear as simple heaps of shining thecæ. The great changes which take place in the condition of this part, render it necessary, if we would understand ferns, to examine the fronds in all stages, and especially when fully developed, but with the sori still young. The sori are then distinct, and the indusia perfect; whereas, when mature, the former often become "confluent," or commingled at the margins, so that instead of clear outlines, we have nothing but confused and dusty patches, or an unbroken and unintelligible brown mass. The indusia at the same time shrivel up, and either fall off or are concealed by the flood of thecæ. When just opening, and the first thecæ are peeping out, as represented in the wood-cut, the appearance is very pretty, and the structure of the parts becomes plain. How important it is to examine the sori is felt when we come across

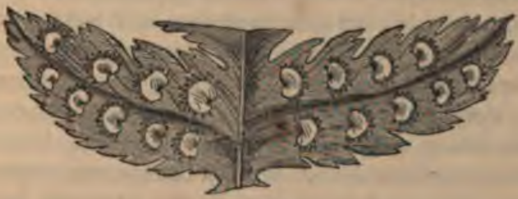


Fig. 211.
Portion of frond, showing sori and indusia.

some of those extraordinary varieties of certain ferns in which the original outline and physiognomy have disappeared, and which can only be determined by reference to characters that never change.

Osmun'da, *Botrych'ium*, and several other ferns have their thecæ in spicate or panicled clusters. These differ also from the dorsiferous species in having no elastic ring to the thecæ, the latter cracking by an even fissure. *Hymenophyl'lum* and *Trichom'anes* are different again, the frond consisting virtually of a branched series of rigid veins, winged throughout their whole extent. The fructification consists in these of an urn-shaped involucre, surrounding the axis of a vein, which is continued beyond the wing or leafy margin.

The most curious part of the history remains to be told. The spores discharged from the thecæ of the ferns are not their seeds after all, but bodies analogous to *flower-buds*. Hence might our search for stamens and pistils, or anything like them, well be in vain, so long as we confine our attention to the sori, which so far from being the complete and final state of the inflorescence, are the scene only of the first stage of preparation. Upon falling to the ground, the spores vegetate as if they were seeds, taking root underneath, and developing little horizontal green plates of cellular tissue. On the under-surface of these plates, which are called *prothalli*, and every one of which is literally a monœcious plant, are then developed organs analogous to stamens and pistils, and the fertilization of the germ being effected, the latter produces root and frondlet, and a new fern appears. To express the analogy of these minute organs with the stamens and pistils of flowering-plants, they are technically termed "antheridia" and "pistillidia." The spores grow wherever they may fall, provided the ground be damp. Hence in our greenhouses and ferneries the young plants soon cover every moist wall, and spring up, like mosses, in every flower-pot.

The number of species of ferns is estimated at two thousand. They grow in all parts of the world, loving chiefly moist warm woods upon islands in happy climates, though some prefer the open plain, the mountain-side, dry banks, and even walls. Not a few haunt the edges of waterfalls, and shady cavernous rocks in deep dells and quiet glens, while others seat themselves on wild cliffs by the spray of the sea. It is a peculiar allurement to the study of this beautiful tribe, that their habitats are almost always of this romantic and elfin character. One kind, at least, is aquatic, and in the tropics many species are epiphytic, mixing with Orchids, Bromeliaceæ, and similar plants, as occupants of the branches and trunks of trees. Those indigenous to Britain, are, like the grasses, variously reckoned, different authors making them thirty-six, forty-two, and fifty or more, according to the value they severally attach to the distinctive characters. They form an admirable subject for the young botanist to commence with, the extent being small, specimens easily procurable, and no plants so easy of preservation for the herbarium.

In beginning the study of ferns, two matters, however, are very important to be borne in mind, namely, that fronds without sori can seldom be depended on as giving a fair idea of the species they belong to, especially when dried; and, secondly, that small and immature frond of common *large* ferns, often, while without sori, closely resemble full-grown fronds of small and rare ones. Unpreparedness for this often leads to material error and disappointment, and often has a little fern-case been filled with supposed fairies that in the course of a few months have become giants. Dried between papers, no plants so well retain their forms and brightness. While others become brown mummies, or seem but atoms of hay with Latin epitaphs, ferns, carefully dried, seem to be only in repose, and are little less available for minute study with the microscope than when alive. A well-prepared portfolio of dried ferns is always an interesting addition to the furniture of the parlour-table, and if supplemented with photographs of rare varieties, possesses high intrinsic value as an object of science. The ingenious often construct sylvan landscapes with dried ferns, placing various species so as to represent trees, and filling in the foreground with lichens and mosses. The maiden-hair, the gold and silver ferns, and the brown relics found in late autumn, mingle, when thus applied, in the most beautiful manner.

SECTION I.

Sori disposed upon the underside of the frond, in the form of spangles, bars, or a continuous marginal braid. Thecæ girt by an elastic ring. Fronds circinate while young.

A. *Fronds simple and undivided*, unless casually at the apex; varying from three inches long and an inch broad, to 2—3—4 feet long by 2—3 inches broad; cordate at the base, pointed, smooth, bright-green, and nearly erect. Stipes and back of the midrib shaggy. Sori in parallel bars of various length, sloping upwards from near the midrib towards the margin, and when ripe, of a dark and furry brown. 32. Hart's-tongue.

B. *Fronds cleft downwards and lengthways into 2—3 linear lobes*, the ends of which are somewhat jagged, and have attenuated points. Plant forming a dense and dull-green patch 2—4—6 inches high. Sori 3—4, long and linear, closely contiguous, and very soon confluent. 29. Forked Spleenwort.

(Sori upon the underside of the frond. Thecæ ringed.)

C. *Frond simply-pinnatifid or quasi-pinnate; the margins of the segments* ENTIRE *or nearly so.*

a. Fronds of two sorts, the sterile ones and the fertile being of different shape and appearance. Sterile fronds numerous, rather spreading, sometimes almost flat upon the ground, 3—15 inches long, lanceolate, and *very tapering at each extremity;* the segments broad and short, very close together, and the clefts extending to the midrib. Fertile fronds very few, rising out of the centre of the plant, much longer and taller than the barren ones, and always *erect;* their segments linear, far apart, 1—2 inches long, mostly curved, and, when ripe, deep brown. Sori linear, one upon each side of the midrib, and soon confluent. 33. Northern Hard-fern.

b. Underside of the fronds completely covered with silvery scales, and, when mature, becoming deep-brown, and resembling rust. Fronds numerous, 3—12 inches long, leathery, tufted, lanceolate, with deeply-sinuated margins, the upper surface green and smooth, and apparently with a delicate lace border, owing to the projection of the scales below. Stipes usually short. Sori oblong, in two oblique rows upon every lobe, and mostly concealed by the scales. Indusium suppressed. 31. Rusty-back.

c. Pinnules oval, seldom more than a quarter of an inch long, exceedingly numerous, slightly crenate, and with little stalks. Fronds tufted, very numerous, 3—15 inches long, and often wavy. Sori 6—8 upon every pinnule, oblong, and slanting away from the midrib.

Stipes and rachis blackish-purple and shining throughout its whole length; the latter keeled on the underside, and, when old, partially denuded of the pinnules, which readily break off and render it wire-like. Plant dark-green. 23. Common Centipede Spleenwort.

Rachis green at the upper part, and flattened on the under surface. Plant light-green. 24. Green Centipede Spleenwort.

d. Lobes only upon the upper half of the frond, (or the lower lobes at all events nearly as long as those in the middle) narrow, and all extending nearly to the midrib: the principal lobes 1—2 inches long. Stipes quite glabrous. Leafy part of the frond 2—15 inches in length, and in outline oblong, except that the apex is pointed. Sori numerous, circular and hemispherical. 1. Common Polypody.

D. *Frond simply pinnatifid or quasi-pinnate,* none of the segments divided or cleft, but all with the *margins notched, serrate, or crenate,* especially towards the tip. Evergreens.

a. Sori linear, sloping upwards from the midrib towards the margin, not crowded, and when ripe, dark-brown. Fronds numerous, 3—12—24 inches long, lanceolate, and very firm; the pinnules ovate, rather distant, 1—2 inches long, unequal at the base, and decurrent upon the rachis, which consequently appears *winged.* Stipes short. 25. Seaside Spleenwort.

(Sori dorsal. Frond simply pinnatifid, the segments notched, serrate, or crenate.)

b. Sori circular. Fronds 3—6—15 inches long.

No indusium. Segments confined to the upper portion of the frond, or if commencing below the middle, the lower ones nearly as long as those in the broadest part; all the segments narrow, and extending nearly to the midrib. Stipes quite glabrous. Leafy part of the frond 2—15 inches in length, 2—4 inches broad, and in outline oblong, except that the apex is pointed. Sori numerous, primrose-colour while young, tawny or golden-yellow when mature. 1. Common Polypody.

Indusium present, circular and peltate. Fronds lanceolate, tapering at each extremity, the segments numerous, often overlapping, crescent-shaped, acute, and unequally serrated, the serratures bristly. Rachis scaly. Plant tufted, firm, rigid, harsh, and deep-green. 17. Holly-fern.

E. *Fronds simply-pinnatifid or quasi-pinnate; the pinnules deeply cut into lobes or segments.* (In certain small species only the principal or lower pinnules are cut, and the cuts are confined to the base.)

1. Segments or lobes of the pinnules *entire.*

Sori circular, and disposed in double rows up the centre of the segments, the lowermost of which are usually elongated, so as to overlap the ends of the segments of the pinnules next above and below. *Fronds 18—36 inches high, and 3—6 inches broad where widest*, slender, brittle, and deciduous. Stipes very long. Root creeping. 8. Bog Shield-fern.

Sori circular, with a *fringe of chaffy hairs* proceeding from the indusium, which last is attached beneath the sorus, and splits, when mature, into irregular segments that form a cup to it. *Fronds lanceolate, 3—5 inches long*, with 6—12 pairs of oblong or triangular pinnules, the 3—7 little lobes of which are rounded. Rare alpine plant. 7. Woodsia.

Sori linear. Fronds numerous, 3—6 inches high; the pinnules few, alternate, wedge-shaped, erect, notched at the end, and *only the lower ones divided.* 28. German Spleenwort.

2. Segments of the principal pinnules deeply notched or serrate.

* *No indusium.* Sori circular. Fronds deciduous.

a. Stipes very long, slender, and brittle. Leafy part of the frond triangular, 4—9 inches long, 3—6 inches wide at the base, sharply-acuminate, the lowest pair of pinnules much the longest, and projecting forwards, or with a downwards direction. Sori numerous, minute, dark-brown, and disposed in short and imperfect rows near the margins of the segments and at their bases. Whole frond finely hairy. 3. Beech-fern.

(Sori dorsal. Frond simply pinnatifid, the pinnules deeply cut or lobed, and their segments notched or serrate.)

b. Stipes very short. Fronds broadly-lanceolate, 6—36 inches high, tufted, and resembling those of the lady-fern.
2. ALPINE POLYPODIUM.

** *Indusium present*, and the sori *linear*. Pinnules commencing from near the base of the fronds, which are lanceolate, broader about the middle, and tapering gradually to each extremity.

† Fronds usually 2—3 feet high, the middle pinnules 3—6 inches long. Segments of the pinnules finely and deeply serrated, and with little stalks. No brown scales, or scarcely any, upon the rachis. Root large; the fronds much tufted, deciduous, thin, very delicate, and light yellowish-green. Sori becoming lunate when old, owing to the convergence of their extremities, and then dark-brown.
21. LADY-FERN.

†† Fronds seldom more than a foot high, and usually less; the middle pinnules rarely more than two inches long, and usually less.

Frond broadest *below the middle*, but always narrowed towards the base. Segments and lobes of the pinnules obovate. Plant fine grass-green; when very luxuriant 18 inches high, usually about a foot. (Frond sometimes nearly linear, and simply pinnatifid.)
27. GREEN LANCEOLATE SPLEENWORT.

Broadest part of the frond *above the middle;* the fronds 3—6 or rarely 9 inches high, and the pinnules usually less than an inch in length.
22. FOUNTAIN SPLEENWORT.

⁂ *Indusium present*, and the sori *circular*.

† Segments of the pinnules very numerous, more or less stalked, mostly with a prominent auricle near the base, and with bristly serratures. Fronds stout, lanceolate, variable in height and width, but usually very large; dark-green, and persistent through the winter. Stipes and rachis very scaly. Lower pinnules sometimes bipinnatifid.

Segments of the pinnules usually decurrent, and tapering to a wedge-shaped base that lies at an acute angle with the pinnule-midrib. Fronds rigid, 1—2—3 feet high.
15. COMMON PRICKLY SHIELD-FERN.

Segments of the pinnules all with distinct stalks and broad bases, the latter nearly parallel with the pinnule-midrib, so that looking at the frond against the sky, the midribs have a line of light on either side. Fronds 2—3—5 feet high, and rather lax.
16. GREAT PRICKLY SHIELD-FERN.

(Sori dorsal. Frond simply pinnatifid, the pinnules deeply cut or lobed, and their segments notched or serrate. Sori circular, and with indusia.)

- †† Segments of the pinnules entirely destitute of stalks, and attached to the midrib by their whole width.
  - ‡ Sori disposed along the margins of the segments, forming a nearly continuous beaded line. Fronds deciduous, tapering at each extremity, 1—3 feet high, much tufted, yellowish-green, and sprinkled on the under-surface with shining resinous globules that evolve an aromatic odour when the plant is rubbed. 9. SWEET MOUNTAIN SHIELD-FERN.
  - ‡‡ Sori near the base or centre of the segments, which last are *flat*, or at least *not crisped*.
    - *a*. Fronds usually very large and robust, 1—4 feet high, broadly ovate-lanceolate, and tapering to each extremity. Segments of the pinnules obtuse and finely-serrated. Rachis scaly. Sori very copious, close together, and conspicuous, but scarcely extending more than half-way up the segments. Indusia large, very conspicuous, and lead-coloured while young. 10. COMMON SHIELD-FERN.
    - *b*. Fronds 18—30 inches high, remarkably erect, deciduous, narrow-oblong, (in the typical form nearly the same width all the way up, though pointed at the summit) the pinnules rather distant, and the stipes about one-third as long as the leafy portion. Sori large, in simple rows equidistant from the midrib and the margin of the segment, and usually confined in a remarkable manner to the uppermost portion of the frond. Rhizome creeping. 12. CRESTED SHIELD-FERN.
    - *c*. Fronds 1—3—5 feet high, evergreen, usually with a long stipes, the leafy portion triangular-ovate, and usually broad at the base, and more or less disposed to droop. Segments with spinulose serratures. Rhizome *not* creeping. Sori small and distant, the indusium soon disappearing. 11. BROAD-LEAVED SYLVAN SHIELD-FERN.
    - *d*. Fronds 1—2 feet high, narrow-triangular. Stipes densely scaly. Segments not spinulose. Indusium large and permanent. Plant glandular, and slightly fragrant when rubbed. 14. SMALL RIGID SHIELD-FERN.
  - ‡‡‡ Sori as in ‡‡, but the segments remarkably crisped; the leafy portion of the frond triangular and drooping. Plant glandular and hay-scented, 1—2 feet high. 13. CRISPY SHIELD-FERN.

(Sori dorsal.)

F. Frond more or less branched, the branches either bearing pinnules or subdivided into smaller branches, which are pinnatifid or *quasi*-pinnate, the segments sometimes resembling the leaflets of compound leaves.

a. Fronds of two different shapes; some barren, and with broad and flat segments; the others fertile, and with narrow or linear segments.

Sori marginal. Fronds 6—9 inches high, densely tufted, delicate pea-green, much divided, and resembling parsley. Stipes very long, and destitute of scales. Segments of the barren fronds flat and wedge-shaped; of the fertile ones, (which are rather taller) elliptic-oblong. Roots perennial; fronds deciduous. 6. PARSLEY-FERN.

Sori scattered upon the surface, linear, forked, and without indusia. Fronds in little tufts, the fertile ones 3—6 inches high, much taller and larger than the barren ones, and the leafy portion ovate in outline. Stipes about half the length of the whole frond. Plant annual or biennial. 20. GYMNOGRAMMA.

b. Fronds all alike.

1. Sori forming a continuous marginal braid. Fronds very large, solitary, triangular, 2—6—8 feet high, and 2—3—5 feet broad where widest, the branches spreading almost horizontally. Stipes long, downy while young, glabrous when mature, angular and sharp-edged. Segments lanceolate, the upper ones gradually smaller, the terminal lobe much the largest. Whole plant very robust, rigid and tough, and in autumn, before decay, turning brown. 34. COMMON BRAKE.

2. Sori linear, and scattered over the under-surface of the segments.

Segments 5—10—15, wedge-shaped, and notched at the end. Fronds 2—5 inches high, densely-tufted, and dark blueish-green, resembling rue-leaves. Stipes long. Sori in the middle of the segments, finally confluent, and covering the whole surface with brown thecæ. Plant evergreen. 30. WALL-RUE FERN.

Branches numerous, the segments also numerous, with many lanceolate and deeply-serrated lobes; the primary divisions all sharply pointed. Fronds more or less *deltoid*, pointed at the apex, 3—12 inches high, smooth, firm, leathery, and nearly erect. Rachis not winged, and quite glabrous. Indusia, while young, white and conspicuous. Sori, when old, very confluent. 26. COMMON DELTOID SPLEENWORT.

Fronds 6-12-18 inches high, *lanceolate*, always narrow towards the base, the segments and lobes obovate. Plant thin and delicate grass-green. Stipes and rachis with a few linear scales. Sori and indusia as in the preceding. 27. GREEN LANCEOLATE SPLEENWORT.

(Sori dorsal. Fronds branched, and all alike.)

3. *Sori forming lunate dots* upon the *margin of the segments;* the latter fan-shaped, about a quarter of an inch long and broad, rounded, notched, and upon hair-like stalks, the veins radiating upwards. Fronds 6—12 inches high, ovate in general outline; the long stipes, the rachis, and its slender branches all of a shining purplish-black.
35. English Maiden-hair.

4. *Sori forming circular dots* upon the *surface of the segments.*

* Frond three-branched, and at least as broad as long. Stipes long and naked.

† Sori without indusia.

Branches deflexed where they spring from the stipes, the centre one largest, and the frond, when flattened, 2—6 inches wide, and nearly pentagonal. Segments somewhat crenate. Stipes 3—6—15 inches high, very slender and brittle. Sori, when ripe, brown and permanently distinct. Plant of a very delicate and tender yellowish-green.
4. Oak-fern.

Resembling the last, but the branches much less deflexed, the plant hard and rigid, and dull deep-green, and the surface of the frond mealy-glandular. Sori crowded, and finally confluent.
5. Limestone Polypodium.

†† Sori enclosed while young, in a globular and bladder-like indusium. Fronds with the general outline and appearance of the *Polypo'dium calca'reum.*
19. Mountain Bladder-fern.

** Frond many-branched in a pinnate manner, and much longer than broad.

Sori reniform, the indusium not bladder-like while young. Fronds triangular-lanceolate or ovate, 1—2—4 feet high, arched, very handsome, conspicuous, and evergreen. 11. Broad-leaved Sylvan Shield-fern.

Indusium bladder-like while young. Fronds 3—6—12 inches high, very delicate, fragile, light-green, and semi-translucent. Stipes without scales except at the base, and very brittle. 18. Common Bladder-fern.

SECTION II.

Fructification not upon the under-surface of the frond. Thecæ without a distinct elastic ring.

A. Fructification in panicles.

* Fronds many together, 3—6—12 feet high, doubly *quasi*-pinnate, the segments 1—2 inches long, broad and flat. Panicles terminal, much branched, the branchlets consisting of long spire-like clusters of thecæ, every cluster representing what in the numerous barren fronds are flat and leafy segments. 39. Osmunda.

(Fructification not dorsal. Thecæ without an elastic ring. Spore-cases panicled.)

** Fronds solitary, 3—6 inches high; the panicle lateral, and resembling a little semi-erect bunch of grapes; the leaf-like portion formed of two rows of crescent-shaped lobes. Every stem with a panicle.
40. Moonwort.

B. Fructification in a linear and tapering spike, which consists of two rows of crowded spore-cases, imbedded in the substance of the spike, and occupying its two opposite sides. Leafy part of the plant solitary, 2—6 inches long, ovate-lanceolate, pointed and entire. Spike 2—4 inches long.
41. Adder's-tongue.

C. Thecæ contained in little cups which project from the edge of very delicate, pellucid, and moss-like fronds.

* Fronds 2—3 inches high, oblong and pinnatifid, with a few deeply-lobed segments. Plant very dark-green.

Rachis, pinnules, segments, and thecæ-cups all in the same plane, and the thecæ-cups compressed and bristly-serrate.
37. Common Filmy-fern.

Similar to the preceding, but the pinnules curved, and the thecæ-cups entire. 38. Wilson's Filmy-fern.

** Fronds 3—9 inches high, triangular, branched, with very numerous segments and lobes, and of an exquisitely pellucid yellowish-green.
36. Killarney Fern.

HABITATS AND DISTRIBUTION.

1. Common Polypody—*Polypo'dium vulga're.*

Dry and mossy hedgebanks; about the stumps and roots of trees, and on the bosses of the trunks of aged ones in woods, like a tropical epiphyte; also on rocks, walls, ruins, sides of ancient bridges, and old thatched roofs. Common all over Britain.

Curtis, i. 68; E. B. xvi. 1149.

Several curious varieties occur. Sometimes a large number of the pinnules are forked at the end, like the tail of a fish; in other examples they are sharply acuminate, or very deeply serrated; more remarkable than all, however, is the very singular plant formerly esteemed a species, and called *Polypo'dium Cam'bricum.* The lobes of this last are very broad, and deeply pinnatifid, the segments acute and serrate, and usually without sori.

For a fernery the common Polypody is invaluable, and when covered with its orange-tinted fruit, is excelled in beauty by none. Grown in shallow pans filled with coco-nut waste, it spreads rapidly and luxuriantly, clutching the edges with its tawny claws like the *Daval'lia Canarien'sis.* It was a brilliant golden-spangled specimen of this pretty plant, growing out of an old wall by the roadside ascending to Failand, that first attracted me to the study of botany.

2. Alpine Polypodium—*Polypo'dium alpes'tre.*

Mountains in the Highlands of Scotland. Perthshire, Forfarshire, &c. at an altitude of 2,000—4,000 feet, plentiful, and in its lower range, in company with the Lady-fern.

By some, generically distinguished under the name of *Pseudathyr'ium*, and so styled from its resemblance to the *Asple'nium* or *Athyr'ium Filix-fœm'ina*. "*Pseudathyr'ium flex'ile*" differs only in its narrower and more open fronds.

3. Beech-fern—*Polypo'dium Phegop'teris.*

Moist woods, and shady banks near waterfalls, where overhung by trees, in ravines and glens. Common, except in the eastern counties, and with a preference for the north.

E. B. xxxi. 2224 (and xv. 1018, by mistake for *Aspid'ium Thelyp'teris.*)

The name "beech-fern" refers not, as some suppose, to the fact of the plant growing especially in beech-woods, which is not by any means the fact,—but to the form of the frond, after the principal portion of the stalk has been broken off. It then closely resembles the profile of a beech-tree, the lowermost branches drooping towards the ground.

4. Oak-fern—*Polypo'dium Dryop'teris.*

Damp woods and cloughs, growing on banks where its roots, though continually moistened, are never exposed to stagnant wet. Common, except in the eastern and southern counties, and like the beech-fern, with a predilection for the north.

E. B. ix. 616.

Named on the same principle as the beech-fern, viz., not from the favourite habitation of the plant being under or among oak-trees, but from the figure of the frond when laid flat. It then gives a miniature outline of the oak-tree, with its wide-spreading branches, and comparatively low stature.

5. Limestone Polypodium—*Polypo'dium calca'reum.*

Dry and earthy banks, upon a subsoil of limestone, both under trees and exposed to the sun. Not common, and almost confined to limestone. Ashbrook Dale, near Buxton, abundant. Cheddar Cliffs. Banks of the Wye, near Ross. In a wood upon the Weathercote side of Ingleborough, in company with *P. Dryop'teris.*

E. B. xxii. 1525.

6. Parsley-fern—*Cryptogram'ma cris'pa.*

Hillsides in subalpine districts, often growing among stones; also on banks and by waysides where the ground is stony, and usually very abundant. Chiefly in the north of England and in Scotland.

E. B. xvii. 1160 (as *Pte'ris cris'pa.*)

7. Woodsia—*Woods'ia Ilven'sis.*

Alpine rocks; rare, and from the nature of its habitat, confined to the high mountains of North Wales, Scotland, and the north of England.

E. B. Supp. i. 2616.

Woods'ia hyperbo'rea (E. B. xxix. 2023 as *Polypo'dium hyperbo'reum*) is distinguished by its smaller size, less amount of hairiness, and a more triangular form of the pinnules.

8. Bog Shield-fern—*Aspid'ium Thelyp'teris.*

Borders of swamps and morasses, and on the steep edges of lakes and meres, loving deep and wet bog-soil, and to be half-concealed in a jungle of sweet-gale and low willows. Widely dispersed, but rather local, and often considered "rare." Northamptonshire fens, common. Cheshire, in many places, abundant.

(The E. B. figure of *Thelyp'teris* is *Polypo'dium Phegop'teris.*)

This, and the six following species of *Aspid'ium*, say *Oreop'teris*, *Filix-mas*, *dilata'tum*, *crista'tum*, *rig'idum*, and *recur'vum*, are in most modern works on Botany distinguished under the generic name of *Las'trea.* The character consists in the indusium being reniform, and attached by the notch; whereas in the other British *Aspid'iums*, distinguished under the name of *Polys'tichum*, the indusium is circular, and attached by the centre.

9. Sweet Mountain Shield-fern—*Aspid'ium Oreop'teris.*

Woods and shady cloughs; steep hill-side brows, where somewhat shaded, and on ditch-banks, preferring sandstone. Common in the northern parts of the island; rather less so in the southern, though still plentiful. Near Manchester in profusion.

E. B. xv. 1019 (as *Polypo'dium Oreop'teris.*)

10. Common Shield-fern—*Aspid'ium Filix-mas.*

Everywhere in woods, and upon hedge and ditch-banks.

Curtis, iii. 554; E. B. xxi. 1458.

The principal variety of this handsome and well-known fern is the *crista'tum*, the peculiarity of which consists in the pinnules being tasselled at the extremities. Another very beautiful one is called *palea'ceum*, from the great abundance of its rich-brown scales. No fern is more useful to the cultivator, since it will grow in any kind of soil, and in mild seasons is nearly evergreen.

11. Broad-leaved Sylvan Shield-fern—*Aspid'ium dilata'tum.*

Everywhere in woods and groves, and more especially in damp glens and shady cloughs.

E. B. xxi. 1461.

An extremely variable fern, but always striking and handsome. Some of the modifications have been esteemed species, as *Aspid'ium dumeto'rum.*

12. Crested Shield-fern—*Aspid'ium crista'tum.*

Swampy and boggy places, and in damp woods: the typical form local and rare, and found chiefly in the middle parts of England; the aberrant forms common everywhere.

Curtis, iii. 555 (very accurate); E. B. xxx. 2125.

The aberrant forms are represented chiefly in the fern commonly called *Aspid'ium spinulo'sum*, the fronds of which are much more triangular than in the normal state. Another, of considerable size, is called *Aspid'ium uligino'sum.*

13. Crispy Shield-fern—*Aspid'ium recur'vum.*

Dry, rocky, and shady places, where water soon percolates through the soil. In the west and north of England not uncommon. Found also in Scotland and Ireland. Very plentiful about Penzance, and in the woods at Killarney.

14. Small Rigid Shield-fern—*Aspid'ium rig'idum.*

Rocky places on calcareous mountains; rare, and almost confined to the north of England. Westmoreland. Yorkshire.

E. B. Supp. ii. 2524.

15. Common Prickly Shield-fern—*Aspid'ium aculea'tum.*

Woods, groves, and shady banks; common nearly all over Britain.

E. B. xxii. 1562.

An extremely variable fern. When the frond is very narrow, and the segments are more confluent than usual, and less distinctly auricled, it is the "*Aspid'ium loba'tum.*" (E. B. xxii. 1563.) When still smaller, and the segments are again more confluent, it is the "*Aspid'ium lonchitidoi'des.*" Besides these there are many varieties kept in ferneries, some of which seem to indicate a transition to the following, and may possibly prove it to be only a modification of the present species.

16. Great Prickly Shield-fern—*Aspid'ium angula're.*

Woods, groves, and shady banks; common, and usually plentiful.

E. B. Supp. ii. 2776.

17. Holly-fern—*Aspid'ium Lonchi'tis.*

Clefts of rocks, and in wild and exposed places upon high mountains. Rather rare, and only found in the subalpine districts of the north of England, North Wales, Scotland, and the west of Ireland.

E. B. xii. 797 (as *Polypo'dium Lonchi'tis.*)

18. Common Bladder-fern—*Cistop'teris frag'ilis.*

Earthy cliffs, crevices of limestone rocks, and stony banks in woods on calcareous soil. Dispersed all over Britain, and in the mountainous districts generally abundant.

E. B. xxiii. 1587.

Cistop'teris frag'ilis, like many other ferns, is a group rather than a species, so numerous are the forms under which it occurs. The principal are *Cistop'teris denta'ta*, (E. B. xxiii. 1588.) a plant with the lobes and segments more rounded and entire than usual; *Cistop'teris angusta'ta*, in which all the parts are very slender; and *Cistop'teris Dickiea'na*, in which the segments are very broad and blunt, and the pinnules overlap one another.

19. Mountain Bladder-fern—*Cistop'teris monta'na.*

Moist alpine rocks in the Highlands of Scotland. On a cliff overlooking Glen Lyon, in profusion, covering the mossy ledges for the space of a quarter of a mile, in company with *Sile'ne acau'lis*, &c.

20. Gymnogramma—*Gymnogram'ma leptophyl'la.*

Moist and shady banks in the island of Jersey. Reported also from Derbyshire and Scotland.

21. Lady-fern—*Asple'nium Filix-fœm'ina.*

Everywhere in woods, groves, cloughs, and other shady places; abundant also on ditch-banks.

E. B. xxi. 1459 (as *Aspid'ium Filix-fœm'ina)* and xxxi. 2199 (as *A. irrig'uum.*)

The most delicate and tender of the larger British ferns, the young fronds being sometimes little more than a green film, yet lifting themselves into the air strengthfully, and seldom broken by the wind or rain. The exquisitely fine serratures of the pinnules, and the long and narrow sori, are at all times enough to determine it. That is to say, while in the normal and ordinary condition under which it occurs wild, forming great living sheaves of the brightest and lightest green. The varieties are almost endless. Over sixty have received names; and some, such as the *depaupera'ta* and the *Frizel'liæ*, (the pinnules of which last are circular and not larger than a shilling) are almost incredible. In the wild state, this fern is apt to form a *quasi* trunk or vegetable tumulus of decayed frond-stumps, from the summit of which the new ones rise like a crown.

22. Fountain Spleenwort—*Asple'nium fonta'num.*

Rocks and walls; rare, and perhaps scarcely existing anywhere in Britain in a truly wild state.

E. B. xxix. 2024 (as *Aspid'ium fonta'num.)*

23. Common Centipede Spleenwort—*Asple'nium Trichom'anes.*

Earthy rocks; old walls, and other stonework; moats of ancient manor-houses and castles, from which the water has been drawn off; limestone bridges, with its roots inextricably embedded in the crevices, always avoiding moisture. Common nearly all over Britain.

Curtis, iv. 645; E. B. viii. 576.

A very beautiful little evergreen fern, growing in dense tufts out of the crevices of the rocks and stones among which it loves to insinuate its long black roots, and conspicuous in the fine purplish-black and shining colour of the stalks, which resemble those of the maiden-hair. The segments are sometimes very much larger than usual, and deeply incised.

24. Green Centipede Spleenwort—*Asple'nium vir'ide.*

In choice of habitat similar to the preceding, but more usually in mountainous districts.

E. B. xxxii. 2257.

The segments, like those of the former plant, are sometimes very deeply incised.

25. Seaside Spleenwort—*Asple'nium mari'num.*

Sea-bathed rocks, and in rocky caverns by the sea, creeping out of narrow clefts and holes, and hanging from the roof, as in the great cave at Mousehole, near St. Ives. Tolerably common all round Britain, and extending as far as the Orkneys. On the south-west coast of Ireland, exceedingly luxuriant, the fronds, as in Cornwall, 2—3 feet long. Found also, like thrift and the seaside-plantain, upon mountains remote from the coast.

Curtis, iii. 556; E. B. vi. 392.

26. Common Deltoid Spleenwort—*Asple'nium Adian'tum-ni'grum.*

Rocks, old walls, dry hedgebanks, earthy cliffs, and ruins; common in most parts, though in some districts, as near Manchester, very rare.

E. B. xxviii. 1950.

Luxuriant fronds of this very pretty and attractive fern attain a length sometimes of nearly two feet. When the ultimate lobes are much attenuated, the variety called *acutum* is produced.

27. Green Lanceolate Spleenwort—*Asple'nium lanceola'tum.*

Rocks and walls; chiefly in the extreme south-west of England. Also in South Wales and near Cork. The glory of Penzance, green and vigorous on every wall and hedgebank, 70 fronds or more on a root, and in some places forming the entire covering of loose stone fences. Near Plymouth, plentiful. Guernsey, very abundant.

E. B. iv. 240.

28. German Spleenwort—*Asple'nium German'icum.*

Rocks and old walls; extremely rare, and found only in the Lake District and in Scotland.

E. B. xxxii. 2258 (as *Asple'nium alternifo'lium.*)

29. Forked Spleenwort—*Asple'nium septentriona'le.*

Rocks and old walls; rare, and found chiefly in the north of England and in Ireland.

Curtis, iv. 644; E. B. xv. 1017.

30. Wall-rue Fern—*Asple'nium Ruta-mura'ria.*

Dry and earthy cliffs, and more particularly upon walls, especially in limestone districts. Common, except in the eastern counties and in the north of Scotland.

E. B. iii. 150.

In young plants the fronds are often quite simple and undivided, and in stunted ones the pinnules do not exceed three or four in number. The wall-rue is the only fern that appears spontaneously in towns; and in suburbs where there is much lime, as in those of Bristol, is often very abundant. It grows chiefly on the *upper* part of the wall, and often has cobwebs entangled among the fronds.

31. Rusty-back—*Grammi'tis Cet'erach.*

Earthy limestone cliffs, and old walls built of the same material. Common in many parts, but in Scotland rare. Tickenham, Somersetshire, in the greatest profusion and luxuriance.

E. B. xviii. 1224 (as *Scolopen'drium Cet'erach.*)

When exposed to the full glare of the sun, the fronds are small and much parched, but on the tops of old ivy-sheltered walls, they become exceedingly luxuriant, and acquire a beautiful green hue different from that of any other English fern. Then also the lobes, or a portion of them, are apt to become crenate, and the same happens when the plant is grown in indoor ferneries, though it is one rather difficult to preserve. For the microscope there is no object more interesting than the silvery scales, which seem atoms of silken lace, and shine with prismatic colours.

32. HART'S-TONGUE—*Scolopen'drium vulga're.*

Moist woods and cloughs, especially where warm and kindly; also on moist, shaded rocks, and in cave-like places, and the mouths of old wells; sometimes on dry and exposed walls, but then with a starved and stunted aspect. Common, except in Scotland. In Ireland very plentiful.

Curtis, i. 67 (as *Asple'nium Scolopen'drium*); E. B. xvi. 1150.

The most strongly marked of the British ferns, yet the most capable of change, not less than seventy varieties being enumerated in gardeners' catalogues, and new ones being continually obtained from seed. The versatility of the seedlings is one of the most marvellous hitherto observed among plants, and becomes the more remarkable from the seed of a new variety seldom producing the likeness of its immediate parent. The commonest of the varieties are the digitate and the crested, both occasionally found wild;—the most beautiful is the *crispum*, which has the margins of the fronds most elegantly waved, so as to present a double frill. Every possible modification of irregular and broken margin occurs among them; in other varieties the sori appear along the edges, or burst quite through the frond, and form patches on the upper surface. The tufts of long and bright-green ribbons are conspicuous from a long distance, and contribute more than the foliage of any other herbaceous plant to the perennial verdure of those beautiful woods in the south of England, where Christmas seems only summer a little shorn. Such for example as those at Henbury Court, near Bristol, and in the Undercliff, Isle of Wight. Even in the north, this beautiful plant makes the hedgerows winter-proud. When growing in cavernous places the fronds become perfectly pellucid, and fail to produce fruit. That of mature specimens, if carefully examined, will be found to be *twofold*, every bar consisting in reality of a pair of sori, set face to face, and so closely contiguous as to be confluent for their whole length.

33. NORTHERN HARD-FERN—*Blech'num borea'le.*

Dry banks in heathy woods and cloughs; steep and stony brows of hills; exposed moors, among the whortleberries, and in the narrow spaces among masses of rock overhung with heather; and on the banks and margins of the ditches and drains near peat-mosses. Common in most parts of Britain, but in some, as about Bristol, scarcely seen. Near Manchester, extremely abundant.

Curtis, i. 140 (as *Osmun'da Spi'cant*); E. B. xvii. 1159.

34. Common Brake—*Pte'ris Aquili'na.*

Woods, glens, hedgebanks, mingled with brambles; moors, parks, waysides and waste places; everywhere, (except upon chalk, where it is less at home) often appropriating to itself the whole surface of the ground, and forming a jungle 3—6 feet high.

E. B. xxiv. 1679.

In early spring the ground where this plant flourishes is bare, or but scantily covered with grass; in May the smooth green fronds come up, as it were *backwards*, presenting a curious likeness to kidney-beans at the same period:—by October they form a forest in which a child may be easily hidden, and one with another are larger than most Osmundas. When the stem is pulled out of the ground, and cut through slantwise, the figure of a spread-eagle is presented, whence the name *Aquilina*. The resemblance is closer, perhaps, to the portrait of an oak-tree, with its short and massive trunk and spreading branches. The stem is angular, and rather sharp-edged when full-grown, and should be grasped tightly, or it may cut the hand.

35. English Maiden-hair—*Adian'tum Capil'lus-Ven'eris.*

Clefts and fissures of moist rocks, especially near the sea; caves, and damp stonework of fountains and wells, &c. Rare, and only found in the south-west of England, South Wales, Ireland, and the Isle-of-Man. Carrick Gladdon, between Hayle and St. Ives. Rillidge-point, near Ilfracombe.

E. B. xxii. 1564.

36. Killarney-fern—*Trichom'anes specio'sum.*

Wet and shady rocks, growing out of the crevices and fissures. Reported from various places, but seemingly indigenous only in the neighbourhood of Killarney, and perhaps in Arran. Very luxuriant in a locality upon Snowdon, where it is stated, however, that the roots were planted some years ago.

Curtis, iii. 55 (as *Trichom'anes ala'tum*); E. B. xx. 1470 (as *Hymenophyl'lum ala'tum.*)

Nothing can exceed this plant in translucent delicacy. With care, it will flourish in any fernery, and protected with a glass bell, or grown in a Wardian-case, produces fronds 14—20 inches long. It must always be kept moist, and have at the same time *plenty of air*, which last point is secured by having an aperture with a moveable lid at the top of the bell. The water-drops then hang upon the fronds like drops of oil or liquid gold. But it does best when left uncovered, provided the fernery be *cool*, (a hot one being death to it) and if planted simply on a piece of grit or sandstone, with a little moss. It then fruits abundantly. When grown under bell-glasses, the interior of the glass is apt to become bedewed with the condensed moisture, and we cannot properly see the plant. To correct this, lay a thick coat of woollen thread upon the soil, and it will absorb much of the rising moisture. The same plan may be adopted with lace-leaf Orchids and other plants that it is usual to protect in the same manner.

37. COMMON FILMY-FERN—*Hymenophyl'lum Tunbridgen'se.*

Moist and rocky places upon mountains and in glens, not particularly caring for very wet or dripping places, though a moist surrounding atmosphere is essential. Generally distributed, but predominating in the north and in Scotland.

Curtis, iii. 558; E. B. iii. 162.

When cultivated under glass, this beautiful little plant is often lost through being kept *too wet.* It does best when planted among moss, on the walls of an artificial cave.

38. WILSON'S FILMY-FERN—*Hymenophyl'lum Wilso'ni.*

Similar in general habitat, but preferring the faces of rocks *absolutely wet*, or such as lie at the margins of cascades, and along the edges of mountain streamlets. Common, especially in Scotland and Ireland. Scale Force, Lodore, Dungeon Ghyll, and many other waterfalls in the Lake District.

E. B. Supp. i. 2686.

39. OSMUNDA—*Osmun'da rega'lis.*

Swampy moors, margins of bogs and lakes, slopes of deep wet ditches where the soil is peaty, and in wet thickets of similar basis. Sometimes, as in Cornwall, on sea-cliffs, washed by the spray. Widely diffused, but in many districts very rare and even unknown. Very luxuriant in the New Forest, especially near Ringwood. Isle of Arran, very fine. Lakes of Killarney, in profusion, fringing the waterside. Cheshire, fine and plentiful.

Curtis, iv. 646; E. B. iii. 209.

A magnificent plant, both in its stature and the great panicles of spore-cases, resembling minute brown flowers, which surmount a large number of the fronds. Curious abnormal developments of the panicle are not uncommon. Sometimes the lower half of a branch will be leafy, and the upper half consist of spore-cases; sometimes the upper will be the leafy part, and the lower one the sporiferous; and sometimes there is a medley of the two.

40. MOONWORT—*Botrych'ium Luna'ria.*

Open, hilly, and heathy meadows and pastures; also in large parks, where the soil is somewhat peaty. Generally distributed, but not very common.

Curtis, iii. 553; E. B. v. 318 (as *Osmun'da Luna'ria.)*

41. ADDER'S-TONGUE—*Ophioglos'sum vulga'tum.*

Moist meadows and pastures, soon concealed by the rising grass; also in cloughs and damp woods, bordering the edges of the paths, and there more readily found. Common, except in the northern parts of Scotland.

Curtis, iii. 552; E. B. ii. 108.

"*Ophioglos'sum Lusitan'icum,*" found, as regards Britain, only in the Channel Islands, is distinguishable by no characters except those of smaller size, and blossoming very early in the spring.

The history of fern-culture, like that of Orchids, when it comes to be written at length, will run side by side with the history of Taste. Flowers, in many kinds, have from time to time been popular and "fashionable;" many are so still, and others will doubtless become so in their turn;—the appreciation of Ferns comes of another sentiment entirely, indicating a keen perception of the simple beauty of Form and Expression. It is not these qualities that standing by themselves, recommend flowers. Flowers appeal in many ways at once; gay colours and agreeable odours are there to aid them; the Ferns, in their graceful outlines, like chaste white-marble statues, are literally "unadorned;" the rest is told in the proverb, and the enjoyment of them may be referred to the same capacity as that which procures delight in connection with the æsthetics of Art. A garden now seems unfinished without its fernery, and a greenhouse incomplete if there be not somewhere a little rockery or special corner, where the maidenhair shall unfold the tender green of its delicate leaflets, and the spleenwort lift up its arching feathers, and grand Polypods deck their fronds with bosses of gold. It is an immense recommendation to the culture of ferns, over and above that which is communicated by their beauty, that they grow with so little trouble, need so little pruning, are so little assailed by grubs and insects, and that they flourish best when the good taste that gives them favour, supplies at the same time a romantic habitation, which in itself becomes an ornament to one's dwelling or conservatory. An indoor fernery may be made in almost any old building or outhouse where a sufficiency of light can be admitted by the roof; it is by no means indispensable to build a special greenhouse, and where a greenhouse already exists, any shady appendix that can be united to it will serve the purpose. The best ferneries are of course those that are specially designed as a home for the plants. Where space permits, that home may be made either with stumps and boughs of old trees, tangled as it were heedlessly, and the plants disposed in the clefts: or it may be built with great masses of rock, so as to imitate a defile among the mountains, with water trickling here and there: or it may consist of many aisles, with side-retreats and little grottos, some containing stonework, green with moss; others masses of peat or coco-nut waste, according to the necessities of the various species, archways leading hither and thither, trailed over with *Lygodium*, so that to enter it seems to visit a fern-cathedral. All these designs are represented in private ferneries near Manchester, the neighbourhood of which city is remarkably rich in collections, and not only of ferns, but of choice and costly flowering-plants. Botany owes more to commercial enterprise than many may think. It is to our merchants that we are indebted for some of the best plants that England possesses; and the gardens they construct, and so thoroughly enjoy, are no more than in keeping with the practical energy and enterprise that makes both themselves and their country eminent.

To describe the exotic ferns that are even ordinarily cultivated in Britain is in the present volume of course impossible. Many collections contain at least 500 species. The finest in the country is probably that of Messrs. Backhouse, near York, where there is a paradise of these plants that both in luxury of species and extent of area, is beyond everything that can be conceived without a visit. Tree-ferns, growing as if it were on some sweet island of the South Seas; *Trichom'anes*, in a score of lovely and inexpressible New Zealand forms; everything that is glorious and delightful in pteridology is there to be seen,—and placed in circumstances and conditions as nearly as possible resembling that of the native haunts of the plants. Looking at this vast assemblage, we seem transported to the Age of Ferns, when the world was a kind of enormous Wardian-case, and the advent of man was still far in the distant future. The association of the ferns with the remote periods of the earth's history called the Carboniferous, is of itself sufficient to give them interest with the reflecting. The petrified relics of the Cycadaceæ are seen but seldom, and are little known except to geologists; the beautiful casts and impressions of ferns, afforded from the vast fossil herbaria of the coal-mines, are familiar, on the other hand, to everyone, forming as they do, an important portion of every cabinet devoted to nature's archæology. When thus regarded, there is in this magnificent race a character almost sublime. No mean history is it for the earlier forms to have existed in countless myriads, and on their decay to have subserved so vast a prospective use to mankind; and now for the later ones to stand so grandly, captivating the imagination, and declaring, as it were, that Ferns, as a dynasty, are immortal.

When an outdoor Fernery is constructed below trees, stumps of old ones should not be used. The shade and moisture encourage the growth of fungoid productions, especially if the material be half-decayed, and these are prejudicial alike to the ferns and to such rootlets of the trees as may extend so far. In such places it is important to use only rough stones. Peat-mould is the best for the greater portion of the hardy ferns. Where this cannot be obtained, there is nothing better for the little cavities in which delicate species are planted, than coco-nut waste.

CXCVI. THE HORSETAIL FAMILY.—*Equiseta'ceæ.*

The Horsetails are so called from the appearance of such kinds as the *Telmatei'a*, when a little withered, and held upside down. Compared with other plants they stand alone in respect both of structure and general figure, and though forming part of the modern Flora of our planet, belong essentially, like Cycads and Ferns, to the vegetable history of the pre-Adamite ages. Memorials of a class of plants long since effaced from living nature, wherever they grow in plenty, they give a quaint and primæval character to the scene, floating antiquity into the present, and seeming to exist upon the earth's surface after the manner of old sea-margins. The fossils called Calamites are no doubt the petrified relics of plants that agreed in all material points with the race before us; the only important difference would appear to be that of size, and even this becomes less marked in the presence of the gigantic species Mr. Gardner saw in Brazil, the stem of which he tells us was five or six yards high, and as thick round as a man's arm. All the species at present alive are comprised in the single genus *Equise'tum*, and though the number does not exceed ten or twelve, there are few parts of the world where they do not show themselves. Nine grow wild in Britain, all fond of moisture, and, as a rule, lovers of the swamp and shady glen.

The structure of the Horsetails, though apparently very simple, presents points of considerable interest and novelty. Below the surface of the ground there is a branched, creeping, and perennial rhizome. From this there come up cylindrical, hollow, and jointed stems, about the thickness of a goose-quill, and of heights varying in the British species from a few inches to 6 or 8 feet, and which on the outside are usually furrowed, always perfectly glabrous, and in many cases rough. On cutting the stem crossways, between the outer and inner surfaces of the cylinder there are seen numerous large round holes,—the orifices of air-tubes which have been severed at those points, and which vary so much in size and position as to furnish good discriminative characters.

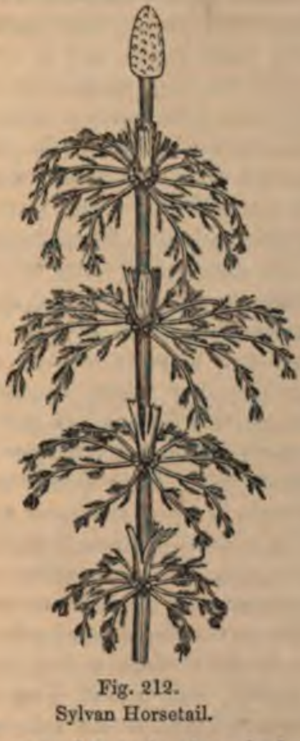


Fig. 212.
Sylvan Horsetail.

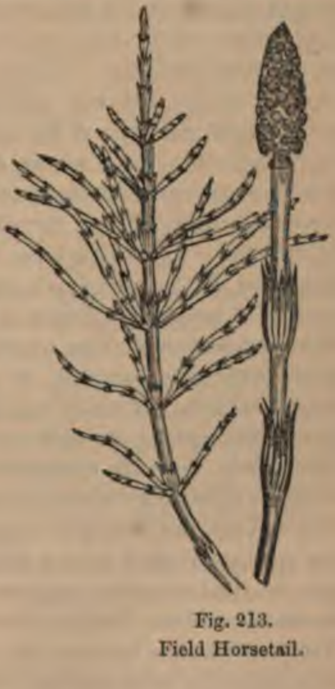


Fig. 213.
Field Horsetail.

At every joint there is a membranous sheath, half an inch to an inch or more in length, enclosing the base of the internode next above it, (of which it forms the socket) and fringed or toothed at the upper edge. These sheaths, or at all events their marginal teeth, are in many cases very conspicuous, making the stem appear ringed at intervals with black or brown. No leaves are developed, but in place of them a considerable number of long, thin, slender, and almost hair-like branches, which spread in regular whorls from the joints of the stem. The branches are sometimes a little compound, usually quite simple, and in a few cases are never produced. In some species the stems are biennial and evergreen; usually, however, they only endure from spring to autumn. The remarkable roughness of the surface comes of this part of the plant being loaded with silicious matter, deposited in the form of little warts, but in lines and figures mathematically exact. When a small piece of the cuticle is magnified, and viewed by polarized light, the spectacle is most brilliant. Not only are the colours intense and vivid, but the arrangement of the particles is so elaborate and symmetrical as to remind us of necklaces wrought in diamonds and tinted jewels.

The fructification of these curious plants is borne in terminal and conical spikes of a brownish or greenish-yellow colour, sometimes deepened to black, and which vary in length from half-an-inch to 2—3 inches. While young, the spikes are nearly sessile, but subsequently, in most kinds, the stalk elongates considerably. Some species have their spikes on separate stems, very different in aspect and colour from the barren ones, and developed a month or two earlier; these flowering-stems are distinguished also by being destitute of green branches, and always fade and disappear very soon. Whether the fertile stems be of different figure or not, both fertile and barren ones are always produced by every species, (as happens with the fronds of ferns) so that every species has to be learned under two aspects; even a third is not infrequent, owing to stems that are ordinarily branched and spikeless, individually becoming fertile as well as green. The spike itself consists of a number of shield-form and many-angled scales, disposed in whorls, and standing slightly apart, so as to give it, while young, a tesselated appearance, and to complete the superficial resemblance which it bears to the cone of a fir-tree. In the *Telmatei'a* the lower whorls are far apart, and the disposition of the whole is very obvious. Under the scales lie the thecæ, six or seven to every one of them, opening internally, and discharging innumerable greenish spores. By the time that the latter are all dispersed, the scales of the cone become separated considerably; they shrivel a little, and the white tissues of their inner substance are disclosed to view. The spores are extremely curious bodies. When magnified, they are found to have four little club-headed filaments attached to the base, and these latter upon being moistened with the breath, are discovered to be hygrometric. Scattered thinly upon the piece of glass used for viewing them, they seem a crowd of minute spiders. The instant they are breathed upon, the filaments curl up, closing round the spore, as the legs of the spider do round the creature's body when it is frightened;—dry in another instant, they uncurl again, quicker than the eye can follow, and thus continue to play as long as we choose, retaining the hygrometric property for many years, and always ready to supply a diverting spectacle.

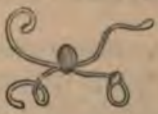


Fig. 214.
Spore of Horsetail (greatly magnified.)

A.—Barren Stems.

A. *Stem white*, 3—5—7 feet high when full-grown, the surface smooth, with indications of about thirty faint furrows. Branches numerous; those of the upper part of the plant (where they are much more crowded than below) 6—8 inches long; the others considerably shorter.

1. Great White-stemmed Horsetail.

B. *Stem green*, never exceeding 3 feet, and in some instances very much less.

* Few or no branches upon the stem.

† Growing in vast crowds in ponds and stagnant water. Branches, if any, short and irregular, straggling out here and there at the upper part of the stem. The latter with 16—20 delicate furrows, but smooth to the touch. 4. Paddock-pipes.

†† Growing in marshes or on land, sometimes in wet woods. Stems rigid, hard, and very rough. Sheaths black, or partially so.

Furrows of stem 15—20. Plant deep glaucous green, 1—2½ feet high. 7. Rough Equisetum.

Furrows 8—10 or fewer.

8. Small Variegated Equisetum, and
9. Mackay's Equisetum.

** Branches of the stem numerous, and symmetrically disposed.

† Branches *all compound or subdivided*, and drooping, so as to form cupolas round the stem; individually 2—4 inches long. Plant tapering to a point, the terminal portion too slender to stand erect, and inclining to the side. Upper part of sheaths bright russet.

3. Sylvan Horsetail.

†† Branches *simple* (or rarely a little branched, and if so, *irregularly.*)

‡ Whorls of very few branches. Furrows of stem 6—8.
5. MARSH HORSETAIL.

‡‡ Branches 10—12 or more to every whorl.

Teeth of sheaths rarely more than ten. Stems often decumbent: the upper portion of the plant much attenuated.
2. COMMON FIELD HORSETAIL.

Teeth seldom less than 14, and usually about 20. Branches at first somewhat pendulous. Upper part of the plant remarkably blunt. 6. DRUMMOND'S HORSETAIL.

B.—FERTILE STEMS.

A. No branches.

* Stem 6—15 inches high, smooth, brownish, and succulent. No portion of the plant green, or possessed even of any rudiments of green branches. Spikes 1—2—3 inches long. (Growing in marshy ground or poor meadow-land, and coming up and disappearing before the barren stems are developed.)

Sheaths at least an inch long, numerous, and completely covering the internodes; the teeth about 40, long, brown, and erect.
1. GREAT WHITE-STEMMED HORSETAIL.

Sheaths less than an inch long, and far apart, being only 3—5 in number, the teeth about 20. 2. COMMON FIELD HORSETAIL.

** Plant growing in water, and forming dense green and rush-like forests; many barren and longer stems intermingled. Spike blackish while young, and very obtuse. 4. PADDOCK-PIPES.

⁂ Growing in swamps, and on land; sometimes in wet woods.

† Sheaths yellowish-white or brownish. Stems annual.

Sheaths delicate light russet, and with 6—8 scarious lobes. Young green branches protruding below them, and developed before the spikes have decayed. 3. SYLVAN HORSETAIL.

Sheaths large, loose, funnel-shaped, and pale, with long subulate teeth. Teeth and furrows of the stem usually 14—20.
6. DRUMMOND'S HORSETAIL.

†† Sheaths more or less ringed with black. Stems usually biennial; rush-like, furrowed, and very rough.

‡ Furrows of stem 15—20. Spike ovoid, acute, and black, with 40—50 scales. 7. ROUGH EQUISETUM.

‡‡ Furrows 8—10, or fewer.

Stems usually all quite simple, 6—18 inches high, much tufted, and often with a somewhat sinuated appearance, owing to the internodes being curved. Scales of spikes 18—25.
8. SMALL VARIEGATED EQUISETUM.

Central stem usually 1—2½ feet high, and with branches. Whole plant very slender. Scales of spike about 30.
9. MACKAY'S EQUISETUM.

B. Stems branched.

* Branches compound and subdivided, 2—4 inches long, pendulous, and forming little cupolas round the stem; the head of the plant more or less flattened or convex. 3. SYLVAN HORSETAIL.

** Branches simple.

† Furrows of stem and teeth of sheaths, 15—20.

Growing in vast crowds in ponds and stagnant water, and resembling rushes. Plant smooth. Branches short, and very irregular, shooting out here and there. 4. PADDOCK-PIPES.

Inhabiting moist woods and shady places. Branches in whorls of about six. 6. DRUMMOND'S EQUISETUM.

†† Furrows and teeth 6—8, rarely 12 or more.

‡ Spike very obtuse, black while young, afterwards brownish and very open. (Sometimes nearly every branch of the two upper whorls bears a spike, but these lateral ones are smaller than is usual with the principal and topmost.) 5. MARSH HORSETAIL.

‡‡ Spike terminating in a short point or minute cone. Plant evergreen, hard, and rough. Branches very few, and generally solitary.

a. Stems all usually simple.

Furrows usually 15—20. Stems 2—3 feet high. 7. ROUGH EQUISETUM.

Furrows usually 8—10. Stems 6—18 inches high, slender, and usually much tufted. Scales of spike 8—25. 8. SMALL VARIEGATED EQUISETUM.

b. Central stem usually branched. Scales of spike about thirty. 9. MACKAY'S EQUISETUM.

HABITATS AND DISTRIBUTION.

1. GREAT WHITE-STEMMED HORSETAIL—*Equise'tum Telmatei'a.*

Marshy and swampy places, where shaded by trees; occasionally in cornfields, and in moist sand by the sea. Common, except in Scotland. Fertile stems in April and May. Barren ones July—October.

E. B. xxviii. 2022 (as *Equise'tum fluviat'ile.*)

The tall white stems, which are often six feet high, and the handsome green spreading branches, form a great ornament to our wet cloughs and marshy woods as autumn approaches, and, like the water-lilies, seem Indian rather than English. Crowded together on a swampy slope, they stand like the pines on a mountain-side in Germany. Though early beaten down by the rain and frost, they are slow to decay, the bent and juiceless relics lying about all through the winter, like skeletons on a battle-field.

2. COMMON FIELD HORSETAIL—*Equise'tum arven'se.*

Ploughed and waste land, hedgebanks and by waysides; everywhere. In low, moist cornfields often a very troublesome weed. Fertile stems in April and May.

Curtis, ii. 284; E. B. xxviii. 2020.

3. SYLVAN HORSETAIL—*Equise'tum sylvat'icum.*

Woods, cloughs, shady ditch-banks, and open fields, where damp and boggy. Common, especially in the north. In the south often wanting. About Manchester in the greatest profusion. Near Bristol unknown. Fertile stems in May.

E. B. xxvii. 1874.

The most beautiful of the genus. The barren stems are incomparably more numerous than the fertile, forming forests of miniature larch-trees.

4. PADDOCK-PIPES—*Equise'tum limo'sum.*

Ponds, reservoirs, and other standing waters, and in the little inlets and bays of canals and sluggish rivers, forming dense aquatic forests of tall thin stems, two or three feet high; abundant everywhere. Fruiting and sterile stems together in the summer.

E. B. xiii. 929.

5. MARSH HORSETAIL—*Equise'tum palus'tre.*

Marshy and swampy places; common everywhere. Fertile and sterile stems (of which latter there are but few) together in the summer.

E. B. xxviii. 2021.

6. DRUMMOND'S HORSETAIL—*Equise'tum Drummon'dii.*

Moist woods and shady places; widely scattered in the northern parts of the island, but rather rare. Abundant on the banks of the Coquet, near Felton, Northumberland. Glen Tilt, in profusion. Found also in Ireland. Fertile stems in May.

E. B. Supp. i. 2777.

7. ROUGH EQUISETUM—*Equise'tum hyema'le.*

Marshes and wet woods; rather rare, and chiefly found in the north. With the *Drummondii*, in the Northumbrian locality, plentiful. Found also in Ireland. Spikes in July and August.

Curtis, iv. 643; E. B. xiii. 915.

Spikes in some state may be found at most periods of the year, and the same is the case with the two following species, all three being evergreen, as expressed in the name *hyema'le.*

8. SMALL VARIEGATED EQUISETUM—*Equise'tum variega'tum.*

Sand-hills by the coast, and on sandy banks of large rivers and lakes, principally near the sea. Not uncommon, but chiefly in the north. About the mouth of the Mersey, and on the coast of Lancashire. Sands of Barrie. Spikes in late summer.

E. B. xxviii. 1987.

9. MACKAY'S EQUISETUM—*Equise'tum Macka'ii.*

Moist banks and mountain-glens; very rare, and hitherto found only in Scotland and the north of Ireland. Spikes in July.

CXCVII. THE LYCOPODIUM FAMILY.—*Lycopodia'ceæ.*

Terrestrial flowerless plants, in certain cases strongly resembling ferns, but always distinctly characterised by the fructification, or if that be absent, by the foliage. The stems are usually prostrate and creeping, generally much branched, and densely clothed with minute leaves that resemble those of mosses. The spore-cases are either sessile in the axils of the upper leaves, or in the axils of bracteas which are so disposed as to form cylindrical and terminal spikes; the thecæ are 1—3 celled, and generally burst by valves.

About 200 species are known, many of them of great delicacy and lasting beauty, and hence very popular with cultivators; the others, from the singularity of their structure, are equally attractive to the student, especially if he be a geologist, since the Lycopods, like the Horsetails, had antetypes in plants which long since passed away from living nature, and are now only known as petrifactions. Their relics constitute the handsome fossils called *Lepidoden'dra.* These stouter and more substantial forms constitute the genus *Lycopo'dium.* They have hard and woody stems, and imbricated leaves, all of the same shape, and arranged spirally; the thecæ are 1-celled and 2-valved, and the spores (which dust out in prodigious quantities) exist under the single form of a fine yellowish powder. The former and more delicate kinds constitute the genus *Selaginel'la.* The stems of these last are usually slender and almost wire-like, and the leaves, instead of being uniform, are of two different sizes, and disposed in peculiar vertical rows, so as to give the branches a flattened appearance, and render the plants moss-like when small, and fern-like when large. There is also an important difference in the fructification of the Selaginellas, the lowermost bract of every spike being found to subtend a theca containing only *four* spores. These four are very much larger than the others; they are distinguished by the name of "granules," and are the only ones that germinate, and reproduce the plant. For indoor ferneries the Selaginellas are inestimable, some kinds mantling the ground, and covering every bank and bit of rockwork with light and mossy verdure; while others grow many feet high, and have beautiful fern-like branches, the innumerable little leaves of which are either of the brightest green in every aspect, or seemingly blue or yellow, if we look from a different point, changing with the light like a lady's shot-silk dress, and becoming veritable plant-chameleons. Such are the *variab'ilis* and the *arbo'rea.* These charming plants are mostly natives of the warm and damp woods of tropical countries. Mr. Bates, in his work on the Amazons, speaks of the ground being in some parts carpeted with them as in England by grasses and mosses. Lycopodiums, on the contrary, though also found in warm latitudes, are fond of the loftiest and bleakest mountains, and are nowhere seen in greater perfection than on the wind-beaten summits of those of Britain. *Lycopo'dium invol'vens*, a native of Mexico and the adjacent regions, is one of the most remarkable curiosities in nature. When alive, the branches spread in a peculiar and very elegant flattened spiral from the centre, covering a space 18 inches in diameter. Dried by the heat of the sun, every branchlet rolls up in a circinate manner, and the plant forms a brown ball the size of an orange, which is soon torn out of the sand by the force of the wind, and blown to a distance over the plain. In this condition we have the plant in our museums, but though dead, it is quite as interesting as when growing. Placed in water, every part opens again, just as if it were alive, the branches and foliage seeming as if moulded out of green bronze, and touched with crimson. When removed from the water, the plant again curls into the orange-form, and remains in that condition till once more wetted.

Six species British.

A.

Spore-cases collected into terminal spikes. Stems creeping or prostrate, but with branches that are more or less erect, and bear the fructification.

* Fruiting-branches simple. Stems 1—3—6 inches long.

Stems much branched, and forming delicate, light-green and moss-like patches. Leaves spreading in all directions. Lower thecæ containing granules. 6. Small Club-moss.

Stems scarcely branched. Leaves all turned upwards. No granules. 5. Bog Club-moss.

** Fruiting-branches forked or clustered.

† Leaves minute, closely imbricated in four rows, giving the branches a square form. Spikes sessile, solitary, terminal, crowded into dense, level-topped, and erect clusters, the fertile branches usually twice dichotomous. 3. Savin-leaved Club-moss.

†† Leaves long and spreading.

Spikes usually two together, pale-yellow, cylindrical, club-shaped, and upon the summit of erect and naked peduncles 2—4 inches long. Stems 2—6—10 feet long, prostrate and creeping, and densely clothed with narrow leaves, that terminate in filamentous points. Extremities of the branches hoary. Whole plant rigid and harsh. 1. Common Club-moss.

Spike solitary, terminal, and sessile. The year's growth of the stem marked by a space where the leaves are appressed, so as to look jointed or "interrupted." 2. Hard Club-moss.

B.

Spore-cases concealed in the axils of the upper stem-leaves. Branches erect, or somewhat decumbent, tufted, repeatedly forked, and densely clothed with leaves, that are disposed in eight vertical rows, the whole forming a dense level-topped tuft 3—6 inches high. 4. Fir Club-moss.

HABITATS AND DISTRIBUTION.

1. Common Club-moss—*Lycopo'dium clava'tum.*

Dry mountainous pastures, stony and heathy places upon hills, and near quarries, where the turf is short. Common, especially in the north. Cader Idris, in profusion.

E. B. iv. 224.

A very curious plant, in favourable localities forming patches two or three feet wide, and many yards in length, the stems travelling, like lithe green caterpillars, in all directions. Brought into the greenhouse, and placed in a pot or suspended basket, it flourishes admirably, the branches swinging to the depth of a yard or more, and producing capsules plentifully. The flexibility of the plant adapts it, in connection with its toughness and long-enduring green, for use even in dress. Fire-flies have been used for this purpose by ladies abroad, and the club-moss in northern Europe serves for an embroidery quite as beautiful and original, with the advantage of lasting longer. Linnæus tells us that in Lapland he saw the boys wreathe the branches about their caps, the long capsules pointing out on all sides, like little horns, and reminding him of satyrs and fauns. The spores are produced in incalculable quantities, and like those of the *alpinum* and other species, are inflammable. If a spoonful be thrown on a lighted paper held at arm's length, they ignite like so much gunpowder, but give no smoke. Sprinkled on water, in a bowl or basin, they enable the hand to be plunged in without wetting; and dusted into the inside of kid-gloves, they render the surface softer than velvet.

2. Hard Club-moss—*Lycopo'dium annot'inum.*

Mountains, at great elevations, and in the wildest and most exposed situations. In Scotland frequent. Found sparingly also in Cumberland and Caernarvonshire.

E. B. xxiv. 1727.

3. Savin-leaved Club-moss—*Lycopo'dium alpi'num.*

Mountains and elevated ground, where there is no cultivation. Common in the north of England; sparingly in the more southern parts. Abundant also in Scotland and the north of Ireland.

E. B. iv. 234.

4. Fir Club-moss—*Lycopo'dium Sela'go.*

Mountains and lofty moorlands; sometimes on heaths and moors of inconsiderable elevation. Common, except in the south.

E. B. iv. 233.

5. Bog Club-moss—*Lycopo'dium inunda'tum.*

Wet and sandy bogs and moors, and especially in damp spots upon heaths where water has stood during winter, and from which the turf has been pared off. Widely distributed, but rather uncommon, and in Ireland not hitherto noticed.

E. B. iv. 239.

6. Small Club-moss—*Lycopo'dium selaginoi'des.*

Moist and sandy places, chiefly upon high ground, where there is little or no cultivation. Also upon the seaside sandhills. Not uncommon, except in the south, where it is scarcely known.

E. B. xvi. 1148.

CXCVIII. THE PILLWORT FAMILY.—*Marsilea'ceæ.*

Insignificant but very curious plants, mostly aquatic or semi-aquatic, and differing much from one another in general appearance. The number of species, though not known, is certainly few. They are diffused very widely, occurring chiefly in temperate countries, and present, in their reproductive organs, a remarkably high development. The genera, so far as ascertained, comprise *Pilula'ria*, *Marsil'ea*, *Salvin'ia*, *Azol'la*, and *Isoe'tes*, the last-named sometimes referred to the *Lycopodia'ceæ*, and sometimes made the type of a distinct order called *Isoeta'ceæ*. One of the Marsileas is the famous Nardoo-plant of Australia, the spores of which are available for human food.

Two species British, both, as in Selaginellas, with spores of two kinds and sizes, but contained in the same thecæ.

1. Stems thread-like, a few inches long, slightly branched, creeping upon the surface of the ground on the edges of ponds, &c., or sometimes floating in the water, and throwing down roots at regular intervals from every joint. Leaves from the same joints, linear, 2—3 inches long, erect, and bright green; circinate while in bud. Thecæ resembling pepper-corns, almost sessile in the axils of the leaves, covered with short hairs, and divided into four cells, which, when ripe, open at the top, into four valves.
Pillwort.

2. Plant mainly consisting of a tuft of awl-shaped leaves, varying in height from 3—9 inches, numerous, mostly erect, acute, and obtusely quadrangular. Internally these leaves consist of four longitudinal cells, with transverse partitions. Stem corm-like and rudimentary. Roots long, simple and perpendicular. Thecæ produced in the axils of successive cycles of the leaves, immersed in the substance of the inner face, divided internally into chambers, and indehiscent. Quillwort.

HABITATS AND DISTRIBUTION.

1. PILLWORT—*Pilula'ria globulif'era.*

Edges of ponds and stagnant but clear waters, where liable to be constantly inundated with wet. Common in most parts of England and Wales. In Scotland and Ireland rather rare. Coleshill-pool, near Birmingham, abundant.

Curtis, iii. 560; E. B. viii. 521.

Sometimes grows entirely submerged, a long distance from the edge, and where the water is a yard deep, though once very shallow. The stem then loses its creeping character, and becomes vertical, the thread-like branches forming an acute angle with the stem.

2. QUILLWORT—*Isoe'tes lacus'tris.*

At the bottom of mountain-lakes, where the water is not deep, resembling inundated turf. Lake District, Scotland, and North Wales; common. Llyn-y-Cwm, near Llanberris.

Curtis, iii. 559; E. B. xvi. 1084.

Isoe'tes echinospo'ra is a form in which the larger spores are very acutely instead of bluntly tuberculated. *Isoe'tes Hys'trix* is a recent discovery in the island of Guernsey. Concerning these plants see "The Journal of Botany," vol. i., with coloured plate of the *echinospo'ra.*

Marsil'ea quadrifo'lia is cultivated in Botanic Gardens.

CXCIX. THE MOSS FAMILY.—*Mus'ci.*

The Mosses, in their sweet delicacy and elaborate organisation, prefigure all the most pleasing phenomena that pertain to flowering-plants. Every idea that we find culminating either in the wild forest or in the garden, is anticipated; yet on a scale so minute that without a microscope it is impossible to discover it. The foliage and general figure of the larger species may be observed with ease; but the fructification, on which the distinctions of genera and species primarily depend, and in which the rare and inexpressible beauty of these little plants is chiefly manifest, is in no case to be made out accurately until magnified, as

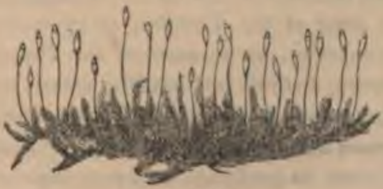


Fig. 215.
Leskea polyantha.

happens indeed with flowerless-plants of every kind. Hence it is well to defer the study of the mosses until the eye has become familiar with the organs of plants of larger dimensions, and the fingers have been somewhat tutored in minute dissection. Then, for the lover of simple nature, there is in the Mosses an inexhaustible fund of delight; the most beautiful forms and colours, the most exquisite designs and adaptations of the Supreme Art, arrest both the eye and the imagination at every step. The man who addresses himself to mosses with earnestness and a good lens, finds in them occupation for the rest of his days, and that in their presence he is a little child over again. So true is it that Nature, sought reverently and intelligently, keeps the heart green, and carries our youth onwards, past all the birthdays.

Ordinarily, the term "moss" is applied to any little plant of simple habit, as to the stonecrops, to saxifrages, to Lycopods, and even to lichens. Strictly, it belongs only to the pretty forms made so familiar by the green mosaic which they diffuse over trees and walls, and which are generally distinguishable at a glance by their numerous urn-like seed-capsules, elevated on long and erect stalks as fine as hair. Not that the seed-capsules are invariably present, but it is in these that the ready test for a moss is usually found. A large number of the species consist merely of a tuft of radical leaves, and a central capsule-stalk, the whole presenting the miniature figure of a snowdrop. In this case the individuals grow densely crowded together, forming bright green or yellowish silky patches, which are often 10 or 12 inches in diameter. These kinds are extremely common upon mortared and earthy walls, on which they plant themselves in luxuriant forests, either of a glowing red colour, as in some of the *Tortulas*, or apple-green, with great abundance of fat capsules, as in some of the *Bryums*. Others are more complex, having distinct and branchy stems, copiously dressed with foliage, in the midst of which rise the capsules, as in Fig. 217. These branching ones belong chiefly to the elegant genus *Hypnum*, the species of which occur in profusion on every moist and shady bank, and in every sequestered wood and glen, and when full-grown are often fern-like. They usually form dense masses, the surface of which is raised several inches above the ground; or the branches spread horizontally and close to the soil, mingling with the violets and other flowering vegetation, amid which they intersperse a thin green lace. Looking with a magnifier into their luscious green, it seems the entanglement of a deep forest, with its recesses of gloom and shade. Many of the species, as *dendroi'des* and *alopecu'rum*, give, in their little outlines, the perfect figure of a tree, the branches spreading umbrageously from a tall bare stem, and losing themselves among the foliage, as if it were a chesnut or an ash instead of a moss. In these tree-like forms the characteristic green hue is now and then richly saturated with gold, as in the *splen'dens* and *Crista-castren'sis*, that shine at all times with yellow brightness. They are chiefly species of *Hyp'num* also that we see shooting out so beautifully over the surface of stones and rocks, and on the bark of aged trees, where the surface is moist, covering them with vegetable crystallizations,—the frost-flowers of the window-panes transferred as it were to the country, and become green and alive. These too are the little plants that form, on the prostrate trunk, green and swelling cushions and natural sofas; and that, as Mr. Ruskin tells us, "full of pity, cover the scarred ruin with a strange and tender honour." In such habitats, even large-growing species remain of low stature;—"their rounded bosses of furry green will not be gathered for chaplet or love-token." Under more favourable circumstances they are apt to form a compact stratum, perhaps half-a-yard across, which may be lifted up and removed like a carpet from a floor, bringing with

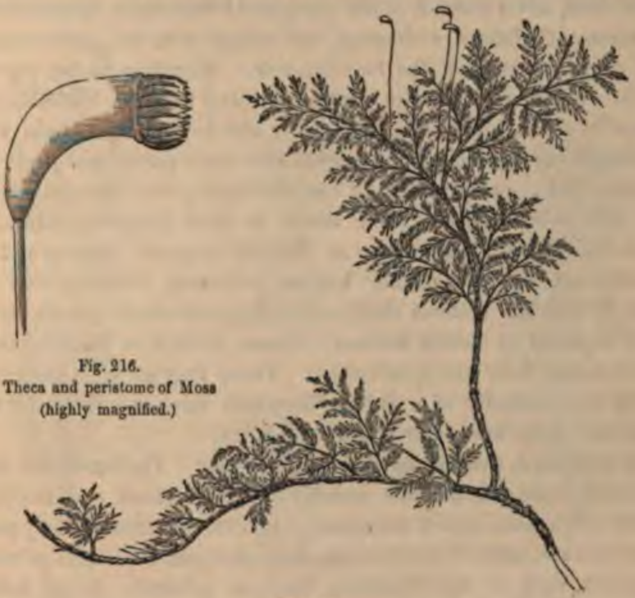


Fig. 216.
Theca and peristome of Moss
(highly magnified.)

Fig. 217.
Hypnum tamariscinum.

it a thousand little fruit-stalks. Another set, represented in the genus *Sphag'num*, is characteristic of the swamp and morass. Vast tracts on every wet moor are entirely occupied by their different species, the plant being aggregated in broad elastic beds,—in the centre, (where saturated with moisture) of the loveliest pea-green; at the edges pallid and withered-looking, though often with rosy tops; and at the margin, where nearly dried up, fading to gray, and almost to white. Of the remainder, not a few select the margins of waterfalls, where they can be incessantly bathed with spray, and mingle with the golden-saxifrage and other haunters of the fountain-side. Mountain-rocks, especially in their chinks and crevices, damp caves and caverns, half-submerged stones in rivers and brooks, dry moors and heaths, road-sides, fallow-fields and garden-walks, all likewise have their peculiar or preferential species, and in every variety of size and figure, from the almost invisible *Phas'cum* upwards; some kinds, as with flowering-plants, very rare, but the principal portion as plentiful as grass. Spring and early summer are the times of their highest perfection, but no period of the year is entirely without their ornament, and some species produce their capsules in double harvest. Green, though so characteristic, is by no means their universal colour. Those that grow in streams and ponds are generally of a dull or brownish hue, and the denizens of mountain-rocks are sometimes almost black.

In substance, the mosses are wholly cellular. The leaves are simple, generally ovate or lanceolate, either entire or serrated, and usually provided with a *quasi*-midrib composed of smaller cells more closely packed. In some, such as the *Trichos'tomum*, they are tipped with hairs or bristles; in others, such as the *Hooke'ria*, they are pellucid. In no instance, so far as observed, are they deciduous. The fructification, as in ferns, consists of two sets of organs, analogous respectively to the stamens and pistils of flowers. The former, called "antheridia," appear in the form of minute vesicles, surrounded by several rows of spreading leaves, which last are collectively termed the "perigonium;"—the female organs, called "pistillidia" or "archegonia," consist of slender flask-shaped bodies, surrounded by a cluster of *erect* leaves, the latter called the "perichætium." In process of time, one of these "pistillidia" develops into a spore-case, called, as in ferns, a "theca," and which eventually becomes charged with atoms that fulfil the purpose of seeds. When mature, this little organ is generally urn-shaped or globular; in position it is either erect, more or less curved sideways, or quite pendulous; and in the principal part of the species, is elevated to the height of an inch or more.

The peduncle is as fine as hair, and round the base of it are found the remainder of the pistillidia, all, except the one spoken of, being abortive. While quite young, the incipient stalk and theca are enveloped in a thin film of cellular tissue. As the stalk lengthens itself, this envelope cracks cross-wise, the lower portion remaining at the base of the stalk, while the upper one is carried aloft in the shape of a conical cap or "calyptra," that protects the theca just as the calyx of a flower protects the young corolla, only that here it is above instead of below.

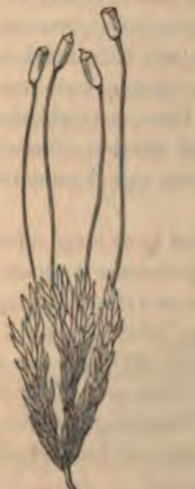


Fig. 218.
Polytrichum urnigerum.

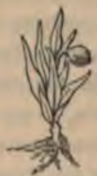


Fig. 219.
Phascum curvicollum.
(magnified.)

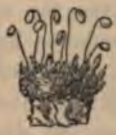


Fig. 220.
Bryum argenteum.

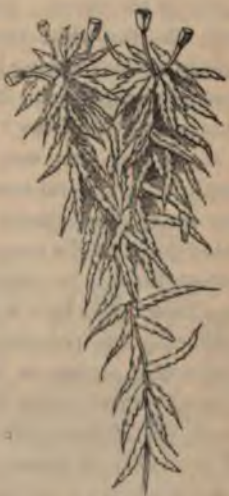


Fig. 221.
Sphagnum acutifolium.

The extinguisher-shaped calyx of the *Eschscholt'zia* exactly represents it on a larger scale, and for an actual example of it there is none better than that afforded in the common *Polyt'richum*. In this it is covered with light-brown hairs, the fringy edge hanging down, and the general figure that of Robinson Crusoe's goat-skin cap. During the enlargement of the theca, the calyptra becomes evenly detached at the base, and generally splits up one side: in the latter case it is called "dimidiate;" when otherwise it is "mitriform." The calyptra being removed, the theca is found to be closed at the mouth by a lid or "operculum," and an intermediate ring or "annulus," which last is coloured, and composed of cells of considerable size. Under the influence of moisture and dryness, the annulus expands and contracts. This causes the lid to fall away by about the time that the theca is ripe, and then comes into view another and extremely beautiful part, called the "peristome,"—a circular row, or sometimes two rows, of long fine teeth, flattened at the base, tapering to a point, marked with transverse bars, and often of a golden, or delicate rose colour, or brilliant crimson. The number of teeth varies from four to eighty, but is always some multiple of four, as eight, sixteen, thirty-two, sixty-four. At first they lie flat, or nearly so, the points meeting in the centre, and thus forming a close cover to the interior of the theca. Afterwards they rise up, and often bend backwards, like the white rays of an opening daisy, thereby enabling the spores to escape; closing however, immediately, like a marigold, should the atmosphere become damp. In the centre of the theca there is a slender pillar called the "columella," very striking and characteristic, but at the same time very often evanescent.

Such is the general structure of the mosses, but in so large a family there are of course many modifications. The peristome is sometimes twisted into a ringlet or spiral tube; in others this part is not developed; in others there is no operculum; in others again, called *Andræ'a*, the theca bursts into four equal valves, the summits of which are held together by the persistent operculum. Some, moreover, have their reproductive organs on separate individuals. Because of these and other differences, some botanists make three distinct families of the mosses, viz. *Brya'ceæ*, *Sphagna'ceæ*, and *Andræa'ceæ*.

The number of known mosses is very considerable, and many more no doubt remain to be discovered, since they grow in every part of the world, though most abundantly in temperate and cold countries. The British species, according to Wilson's "Bryologia," (1855) amount to exactly 444. To give special descriptions of so large a number in a work like the present, is obviously impossible, especially as the descriptions require to be very minute. For these the student must go to works expressly devoted to the subject. Wilson's "Bryologia," with its multitudinous coloured drawings and dissections, is inestimable, both to the proficient and to the beginner. Berkeley's "British Mosses," (1863) and Stark's "Popular History of British Mosses," especially the last-named, are perhaps the best to begin with. For the purpose of study as well as ornament, it is not difficult even to *cultivate* mosses. Mr. Higgins describes his Bryarium as made like a Wardian fern-case, 4½ feet long, proportionately wide and high, and containing no less than 240 species.

many of them fructifying in the greatest perfection, especially the *Bartra'mias*. Mosses may also be introduced with advantage into the Fernery, especially the *Schistoste'ga*, or "golden-light cavern-moss." This fairy-like plant reflects the light only at a certain angle, and when we take our view from the right point, floods the surface on which it grows with a brilliant vegetable phosphorescence, absolutely unimaginable till beheld.

CC. THE MARCHANTIA FAMILY.—*Hepat'icæ.*

Minute plants, with usually much the aspect of mosses, but distinguished from them by their thecæ opening into four or about eight valves; by the absence of a calyptra, and usually of a columella; and by the frequent presence of spiral chains among the spores. Like the mosses, they have their habitats in moist and shady ground, near rivulets, on moist banks, among moss in woods and cloughs, and upon trees; often also upon rocks, where they are exposed to incessant trickling and dropping of water, or to the spray of little cascades. In colour they are either green or purplish. They have a distinct axis of growth, and are usually provided with distinct and symmetrical, though very minute, leaves, which being imbricated in opposite ranks, give a flattened character to the branches;—sometimes, however, stem and

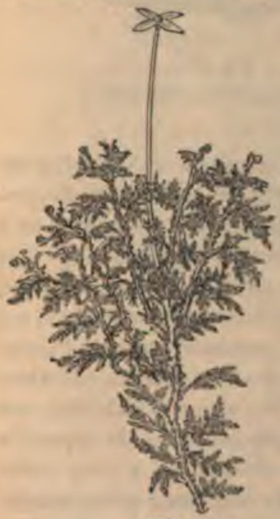
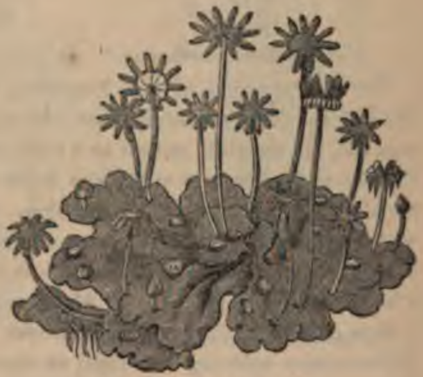


Fig. 222.
Jungermannia tomentella.



Marchantia polymorpha.
Fig. 223.

leaves are fused into a single mass, as in the common but very interesting plant popularly termed "liver-wort." The latter covers the ground everywhere near springs, and the stones and rocks by waterfalls, with a bright-green crystalline skin, the greater portion of which is firmly fastened down. The wrinkled margins of the principal branches, which are lobed like oak-leaves, are alone a little raised, and the whole forms a miniature and imitative ivy. In April and May the new shoots stretch out in all directions, and look like green finger-nails.

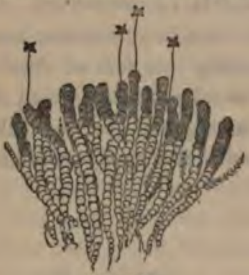


Fig. 224.
Jungermannia compressa.

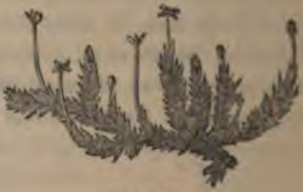


Fig. 225.
Jungermannia bidentata.

The fructification of the Hepaticæ is of course only intelligible through the use of the microscope. That of the principal genus, *Jungerman'nia*, shows itself at first as a little black bead on the summit of a slender and colourless stalk, the bead eventually bursting into four divisions, and then assuming the shape of a tiny cross-shaped flower, with innumerable spores scattered around, a large portion of which are attached to doubly-spiral crimson threads, exquisitely beautiful under a high magnifying power;—in *Marchan'tia* the head of thecæ resembles a little parasol or tiny green mushroom, rising about an inch high, and in due course splitting into rays, as above represented;—in *Fegatel'la* it gives the idea of a "cap-of-liberty," elevated on a long white peduncle; while *Ric'cia* is distinguished by the thecæ being sessile. These and other differences have led many botanists to break up the family into three, *Jungermannia'ceæ*, *Marchantia'ceæ*, and *Riccia'ceæ*. Most of the species are extremely delicate, and except by the inquirers for them, quite unseen; in beauty, however, they scarcely yield to the mosses. The student who would investigate them should consult, in the first place, the coloured drawings in the later volumes of "English Botany," and then procure the monograph by Hooker and Taylor. Nearly a hundred are indigenous, and of these about four-fifths are *Jungerman'nias*.

CLASS IV.—THALLOGENS.

CCI. THE LICHEN FAMILY.—*Li'chenes.*

The Lichens, as a whole, are plants of character so decided that, although pigmies, it is impossible to mistake them. The remarkable fusion of root, stem, and leaves into a single body, which differentiates the Thallogens alike from flowering-plants and from ferns and mosses, is in the Lichens expressed in the plainest possible manner, and although the species are indefinitely varied as to figure, in substance, colours, and habitats they are unique. The ordinary forms are recognised at a glance. With the exception of a few species that are almost microscopic, and of a few others that consist only of minute tubercles, our common lichens present themselves either as dry, crispy, and fringy tufts of a grayish colour, and an inch or two high, or as masses of tangled and wiry branches that resemble uncombed locks of coarse gray hair; or they stretch horizontally into thin, flat, dry, crustaceous plates, covered with raised frills or granulations, in colour gray or yellow, and forming circular or irregular patches 2—3—6 inches across. The tuft, lock, plate, or whatever it may be that constitutes the main body of the

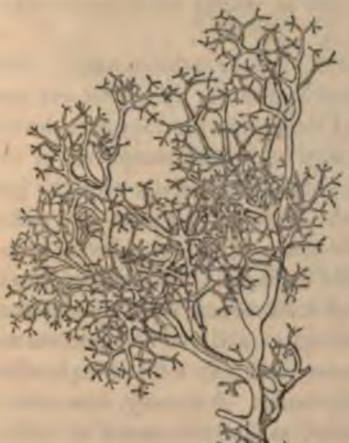


Fig. 226.
Clado'nia rangiferi'na.

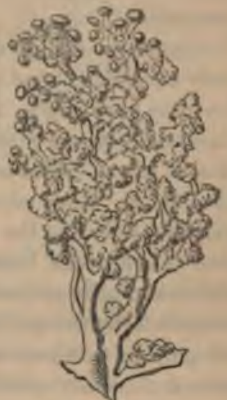


Fig. 227.
Stereocau'lon pascha'le.

lichens is the "thallus." On the surface of this, in due season, are developed crowds of minute shields or saucers of similar colour, scattered indiscriminately, (though in the flat and circular species most numerous in the centre) and generally quite sessile. These saucers and shields, examined with the microscope, are found to be the seats of the fructification. In some species they are produced both infrequently and very sparingly; others, including most of the common forms, are covered with them every year, and since they remain for a long time without undergoing any change, a lichen is usually told by them as easily as an oak by its acorns. There are genera in which neither saucers nor shields are ever developed, and which occupy the borderland between the Lichens and the Fungi. These, called the "angiocarpous" Lichens, can only be told by minute examination with the microscope.

Lichens may often be determined by their habitats alone. With a solitary exception, none live either in water or upon offensive matter, where they give way to Algæ and Fungi, nor are they ever developed in dark and obscure places, or in a confined atmosphere, or in the streets of towns, or on travelled roads, or generally near the habitations of man. They select, on the contrary, the most airy and open situations, some, like the "temple-haunting martlet," loving to reside where "the heavens' breath swells wooingly," while others give their preference to grim and unsheltered wildernesses, stern alpine solitudes, desolate cliffs by the sea, bleak mountains, and wild and pathless moors. None grow in meadows and pastures, and only a few mingle with the flowers and grasses upon the hedgebanks. Ordinarily, moreover, they are not terrestrial plants, but *aërial*, and of the nature of epiphytes, though differing from all true epiphytes in their capacity for growing upon rocks and stones. *Parmelias* of many kinds seat themselves on old monuments in rustic churchyards, and on the walls of castles and abbeys, their broad and eccentric patches of yellow time-stains mingling in fine contrast with the ivy. Others cling to the bark of trees, decrepid and aged ones in particular, clothing them as if with a permanent hoar-frost, or with rough and shaggy beards that often hang from the branches to a depth of several feet. These latter are the species commonly but improperly termed "tree-*mosses*," and often so elegantly alluded to by the poets, as in the opening lines of "Evangeline." Old barns, especially when constructed of boards, old thatch, park-palings, exposed walls in country lanes, and plantations where the trees are too thick and going to decay, especially plantations of firs, are also chosen haunts with these singular plants, which, if there were nothing else to be said in their favour, have at least the merit of making death and barrenness cheerful. Independent of seasons, when other plants are denuded, or gone to rest or decay, (the mosses, the fungi, and a few evergreen trees alone excepted) their diversified hues and crowds of pretty cups still "make glad the solitary place," and the "winter's walk at noon" becomes, in their presence, a little summer. The trees they chiefly select (after the fir) are the ash, the oak, the birch, the sloe, and the hawthorn, all of which, when old, are more or less hung with their tattered livery; the elm, on the other hand, the sycamore, the lime, and the beech, wear it but seldom, and then sparingly. Geographically, as would be anticipated from their habits and the simplicity of their structure, the lichens have the widest possible range. They grow in every part of the world, braving the inclemencies of every climate, encroaching upon the limits of perpetual snow, and ascending to a higher level above the sea than any other species or race of plants. On the summits of high mountains, and in polar regions, they usually form the whole of the vegetation.

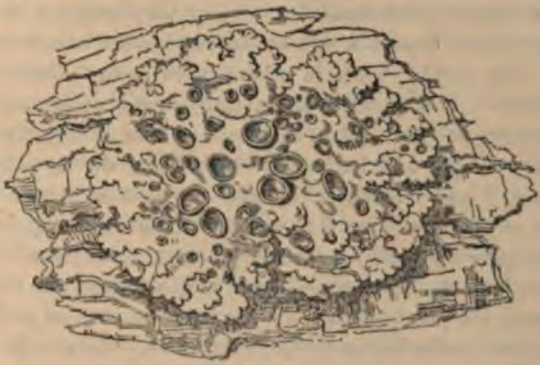


Fig. 228.
Parmelia pulverulenta (on a piece of bark.)

While in their youngest and least developed state, Lichens often appear as a mere powdery or scurfy wash, such as a painter might lay on with a view to some future work; others seem an inorganic and amorphous deposit, like the sediment from a chemical solution. So common is it for them to remain a long time in this primitive state, that formerly these *quasi*-washes were believed to be mature and genuine species, and were even classified into genera, under the names of *Isid'ium*, *Lepra'ria*, and *Variola'ria*. In colour they are like the adult plant, gray, whitish, or yellow. *Green* is a very rare colour with lichens, a circumstance furnishing a ready means of distinguishing the great majority of the family from the mosses, with which they are often popularly confounded, mosses being almost invariably bright green, as well as provided with distinct leaves. When full-grown, as above described, the larger kinds either spread out horizontally, and form irregularly-circular and corrugated or papery plates, or they branch into many short broad laminæ; or they lengthen and ramify into innumerable filaments, which in some cases stand erect, and resemble little shrubs, while in others, such as the *Alecto'rias*, they are pendulous. There are, however, many modifications, and the differences are generally coincident with habitat. The species, for instance, that form a simple and horizontal thallus, are distinguishable into "crustaceous" and "foliaceous;" and the former section is again resolvable into three,—the "tartareous" lichens, thick, hard, and dense, and growing chiefly on weather-beaten rocks; the "leprose," thin and scaly; and the "pulverulent," which consist of a mere scurf. Once formed, the plant seems to endure for ever. Annual and biennial are terms that in this family are quite unknown,—the slow growth and the longevity of individuals is often on a par with that of trees, and the leases of life extend far beyond those of men. This long persistence comes no doubt of their dry nature and airy habitats. They are fond, nevertheless, of occasional moisture, and on the commencement of rainy weather often spring up like new creations. It is at such times, and in winter, when their adhesion is somewhat relaxed, that the rock-loving species are best procurable. At other seasons, chained like Prometheus, they can rarely be disengaged, except in fragments;—if we think to bring away rock and all, we do no better, since they usually select enormous and ponderous masses, that defy even the hammer, unless we ruin the plant in the getting, and even when seated upon embedded stones in walls and upon the mountains, they almost invariably choose the largest and least portable.

The *fructification* of the lichens is usually developed, as already said, in the form either of minute saucers or of tiny shields. The former are not always circular; sometimes they are modified into long and narrow clefts. Whatever the particular shape, and whether saucers or shields, they are called by the general name of "apothecia." The thecæ are exposed on the upper surface, and from this circumstance, all such lichens as possess these organs (comprising all the obvious and common kinds) are associated in one great class called "gymnocarpous." Those referred to as the "angiocarpous," instead of apethecia have "perithecia," that is to say, chambers in certain thickened portions of the thallus, or at the extremities of special branch-like lobes; the chambers individually lined with thecæ, and with an orifice at the summit, through which the spores, when the thecæ ripen, make their exit. In addition to thecæ, Lichens, except in their simplest forms, are provided with important bodies called "gonidia." These are minute green cells developed in a stratum of interlacing filaments that lies between the upper and lower skins of the thallus, and which, when liberated, are capable of expanding into new plants.

The number of British lichens is about 400. Detailed descriptions of them cannot here be given, any more than of the mosses, and for corresponding reasons. The student who would learn them should in the first instance procure Dr. Lindsay's "Popular History," remembering, at the same time, that he can do nothing without the microscope. Afterwards he may consult Leighton and a variety of German authors. Many pretty forms are everywhere close at hand, as the "Reindeer-moss," *Clado'nia rangiferi'na;* the "cup-moss," *Clado'nia pyxida'ta;* and the yellow *Parme'lia* of every wall and hawthorn-hedge. The first-named grows on moors, mountains, and heaths, mingling a silver filagree of little white branches among the moss, rising 1—3 inches high, and with the extremities of the branches usually turned downwards. The cup-moss is seen everywhere on dry hedgebanks, presenting crowds of little mealy gray-green funnels or goblets, half-an-inch to an inch high, scolloped at the edges, and often bearing smaller ones upon their rims. The *Parme'lia* forms great patches of rough and golden scurf, glorious in the depth of winter, and usually with innumerable shields. Looking a little further, we may find on every moor the tiny pillars, with scarlet capitals, of the *Clado'nia exten'sa;* on old oaks, the curious *Stic'ta pulmona'ria*, clothing them with a curiously-pitted and reticulated green vesture; and on every old wall the great gray crispy circles of the *Parme'lia saxat'ilis.* The tiny "letter-lichens," constituting the genera *Gra'phis* and *Opeg'rapha*, and inhabiting the smooth bark of trees, especially that of young beeches, resemble inscriptions in Arabic or Hebrew. Coming upon them in the depths of the "unfrequented woods," we might almost fancy their ancient writing the literature of the Dryads,—science however, that unweaves the rainbow, knows better than poetry, and tells us that the little letters are no more than "sporiferous clefts."

CCI. THE MUSHROOM FAMILY.—*Fungi.*

With the exception of the common mushroom, the truffle, and two or three other species that are used for food in this country, the Fungi are by most people regarded with contempt. The larger kinds are "toadstools;" the smaller ones are anathematized as "mildews,"—even botanists, until latterly, have seldom cared to treat them as they do other plants. Yet Fungi are objects often of remarkable and vivid beauty; their structure, though simple, is very curious; and their functions in the economy of nature, if not elegant, are at least important. In the dingy and vulgar species that spring up near stables and upon hotbeds there is certainly very little to admire, and the same is true of certain kinds that evolve bad odour, such as the *Phal'lus impudi'cus*,—a fungus resembling a small white horn, with a conical and honeycombed cap, common in woods and shrubberies. These we may be justified in disliking; the associations of the plants and their nature are alike unclean, and if all fungi were like them, they would be a disgusting race indeed. But it is not so. Many are as pretty as flowers, and quite as fragrant; and although, as a rule, fungi are attendants upon damp and corruption, a large portion of them grow in places that it is pleasant to visit. Much of the prejudice respecting the race in general has arisen probably from the fact of certain species being poisonous. But half the fairest flowers in nature belong to families in which species more or less venomous are also contained; there are enough esculent and wholesome ones besides to constitute a fair set-off against the malignant.

Like the other Thallogens, the Fungi are composed wholly of cellular tissue. In their simplest form they consist only of a minute filament, which is either simple or articulated, and terminates in a little swelling, that eventually becomes the spore. The maximum is seen in those round, richly-painted tables and cones, elevated on pillars of ivory, and having the general figure of the mushroom, which in autumn so beautifully embellish the woods and fields. There is no essential difference in these latter: they differ only in being more complicated; the noblest of all, such as the gorgeous *Aga'ricus musca'rius*, being no more than a repetition, a thousand times over, of the structure found in the blight upon a leaf. Of these better-class toadstools the variety is almost endless. Some are fashioned like Chinese-parasols; others are shaped like eggs, bowls, cups, or vases; others again lift up broad and circular shields, several inches across, convex or flattened, according to the species, and often with a beautiful dimple in the centre. The colours keep equal pace, running through every shade of red, yellow, orange, lilac, and purple; they are always clear and bright, and the more lustrous from their uniformity, few fungi being variegated on the surface of the cap, though other colours may occur in the parts below. The surface is usually smooth, and often polished; sometimes it is wet or viscid; and occasionally studded with bosses of different hue from that of the ground, or flecked with brown scales that resemble a natural thatch. In some species these bright hues are exchanged for pearly white; in others for brown or black; but there is no instance of *pure green*,—that is to say, of a green like that of the leaves of flowering-plants. When present, which is but seldom, the green is that of verdigris. This negative and striking characteristic of the fungi is accounted for by the circumstance of their taking up oxygen instead of carbon, the green colour of plants in general resulting from their fixation of the latter. The change to red and yellow in autumn, in the case of leaves, comes of those organs being then super-oxygenized.

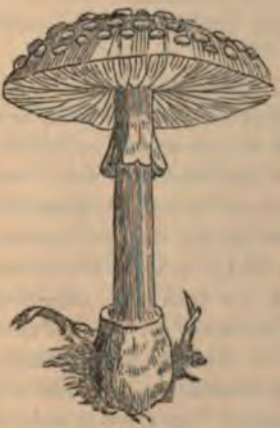


Fig. 229.
Aga'ricus musca'rius.

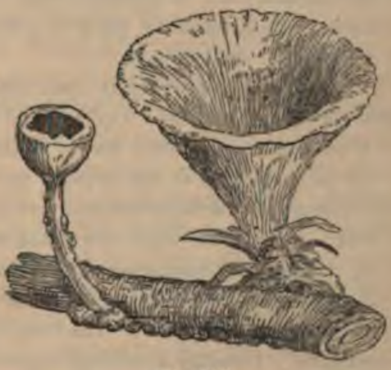


Fig. 230.
Pezi'za.

Besides tables, cones and shields, there are innumerable forms among the fungi that no one can name. Their grotesque yet mostly elegant configurations are, in fact, beyond recounting. The puff-balls, before they burst, are perfectly spherical; some consist of strata of thin plates that look like shreds of olive or purple velvet; the *Cla'thrus cancella'tus* consists of open basket-work; *Clava'rias* shoot out tufts of little clubs resembling coral. In size they are equally diversified, ranging from a breadth of several feet, as in the great spongy *Polypo'ri*, to the delicate form of the little *Nidula'ria*, that grows on old sticks in woods, and seems a tiny bird's-nest with five or six eggs in it. The range of hue is equally varied, running, as in those of the mushroom-type, through every colour but green; and strange to say, many are good to eat! Species having scarcely any external likeness to the mushroom appear to be in many cases perfectly unobjectionable. No rule however can be given to the inexperienced as to the discrimination of wholesome from poisonous species. If the odour be ammoniacal, and the taste pungent, the fungus should certainly not be meddled with; and the same if the colour be verdigris, or any shade of black or purple, and the plant be growing in a damp and shady place.

This wonderful diversity in form and colour is accompanied by as great variety of *habitat*. Open fields and meadows; woods, among the moss and crimp brown leaves of the former season, or where the newly-fallen foliage of the present year lies thick and wet; rotting vegetable *débris;* dead sticks and stumps, and decaying organic refuse of every conceivable kind, are inhabited by the different species, it being the peculiar characteristic of the Fungi to seat themselves on dead and decomposing matters, which at the same time, they largely assist to remove from view. The fungi, in a word, are a kind of natural scavengers. Directly anything begins to decay, whether animal or vegetable, fungi in some shape, begin to consume it; whenever we see fungi growing in crowds, we may be assured that there is some substance underneath from which life has departed, if it be not absolutely rotten and offensive. Hence their curious importance in the general economy of nature, as above adverted to. The duty perhaps is mean, but it cannot be said to be meanly performed. The dead thing, whatever it be, is decked, while it decomposes, with a strange and anomalous beauty; "decay's effacing fingers" are adorned, as it were, with jewels. Coincident with their life and history are also many pleasing phenomena, that detach the mind from the idea of death, and excite ideas not far from poetical. Such is the production of the green circles often seen upon soft and grassy hills and downs, and occasionally in quiet fields, and which are popularly called by the name of "fairy-rings." These rings originate with certain fungi of the mushroom-type, commencing with a single individual, which scatters its spores centrifugally. The fungi that rise from these spores, in propagating move further away again; the next crop does the same, and so do the crops that succeed, every new generation enlarging the area, but not a single individual moving inwards, (just as we see the little wave-circles spread across the surface of still water) so that in the course of time the ring of fungi is many feet and even yards in diameter. The fungi themselves are of course only temporary in duration. When they decay, (especially after the fall of rain) the ring of turf they occupied is observed to be greener. This dark circle is the "fairy-ring," and is physically caused, in all likelihood, by the fungi concentrating considerable quantities of nutrient matter, which on their decay, becomes deposited in the soil. The little *Oid'ium fructigé'num* forms circles of similar nature.

Another set of Fungi take up their residence on *living* organisms, preferring those which are in bad health. These are the minute and often microscopic forms called "blights," "moulds," and "rust." Every species of plant seems subject to the attacks of one or more of their innumerable kinds, and the effect is at times, exceedingly destructive. It would appear, however, that atmospheric contingencies are needful to their development in *quantities;* otherwise they would be permanent and universal pests, whereas in general they are found only on individuals and uncertainly. To this class belongs the *Cordy'ceps purpu'rea*, which attacking the young pistils of rye and certain grasses, is the origin of ergot;—here also are found the plants identified with those remarkable and too-familiar forms of vegetable cholera termed the "vine-disease" and the "potato-disease," which are not *caused* by the fungus, but prepare the way for it, the growth of the mildew supervening on a weakened state of the plant, induced probably, by excessive over-culture, and a consequently unhealthy state of the tissues. When first developed, these little parasites present themselves as whitish or orange-coloured dots or blotches. In a little while they extend their area, and on being magnified, resolve into filamentous tufts or clusters of tubercles that are usually of great beauty. They are frequently generated beneath the skin of the plant, bursting through it, when ready, like an eruption. Parasitic fungi of similar nature are developed even upon the bodies of animals. It is worthy of note that these smaller fungi, and indeed many of the larger kinds as well, are indifferent as to the direction in which they grow. They will shoot either upwards, or downwards, or sideways, and frequently manifest little or no regard for light, which to all other plants is so powerfully attractive. It is proper to remark also that these minute forms of fungi are by no means always injurious in their operation. Some of the *Botryta'ceæ* are of vast utility to man, through the chemical changes which they induce in the substances in which they flourish.

Leaves, flowers, proper stems or roots, it is hardly necessary to say the Fungi do not in any case possess. The common mushroom is the type of their organization, and anything not discoverable in the mushroom will be looked for in vain anywhere else. The thallus, or vegetative portion, is termed the "mycelium." Unlike that of the Lichens, it is developed below the surface of the ground, or is embedded in the substance of whatever the plant may be growing upon, diffusing itself after the manner of roots, and generally appearing as a mass of whitish filaments, well-known in the case of the mushroom, the mycelium of which plant is by gardeners termed the "spawn." The fructification is developed upon portions of the mycelium that are brought into contact with the air, and which then taking one or other of the forms above alluded to, the mushroom, toadstool, puff-ball, &c., goes through stages analogous to those of flowers, eventually producing spores, and then decaying. The mushroom is thus not the plant itself, but equivalent to the peduncle and inflorescence of a flowering-plant, and the same is the case with almost all other fungoid productions that resemble it. Sometimes the fungus remains in the thalloid condition almost indefinitely, as happens with the odd and abnormal growths called *Rhizomor'phas*, which spread themselves below the bark of dead and dying trees, and largely assist in the process of decortication, pieces of bark several feet in length being often loosened by them and made fall off, or rendered unable to resist the slightest external force. In company with these subcortical forms are found myriads of xylophagous insects. "Dry-rot," which should rather be called "damp-rot," is a term expressing the operation of a thalloid development of similar nature. They are Fungi in the thalloid state which are often seen also in cellars, caverns, railway-tunnels, and other dark moist places, where they frequently spread over the walls as a circular patch of velvety and coloured film, and present an extremely beautiful appearance.

The reproductive apparatus, though very simple, is quite as marked in character as that of any other of the flowerless-plants, and serves (in connection with the general form of the plant) for the distribution of the species into four great primary sections, which by some botanists are considered separate families. These are (1.) the *Agarica'ceæ*, represented in the common mushroom; (2.) the *Exidia'ceæ*, represented upon every old stump and gate-post by a little fungus that forms innumerable horizontal and velvety plates; (3.) the *Sphæria'ceæ*, comprising most of the parasitic blights upon leaves, &c.; and (4.) the *Botryta'ceæ*, in which are included all such plants as the common blue-mould that grows upon fruit and preserves, and that gives to cheese its new and epicurean value. The species of the two latter sections are, when magnified, most beautiful little objects, and give us, over again, a miniature flower-garden. The *Aspergil'lus penicilla'tus* (so named from its resemblance to the brush with which the holy-water is sprinkled in Roman Catholic churches) consists of a stem fine as a hair, with a cluster of beaded tassels on the summit; *Sphæ'rias* stud the surfaces on which they grow with button-like gems, which by and bye expand into circular frills. The last-named have close relations with the Lichens, to which family the Fungi at this point approach so nearly, that the absence of chlorophyll from the thallus is the only good distinctive character. In the first and most important section, named after the great genus *Agaricus*, the spores are developed upon that beautiful set of thin vertical plates, often with shorter ones in the interstices, which radiates from the summit of the stalk, and which becomes visible, (except in certain species that seem inverted) only by looking from underneath. Technically this part is termed the "hymenium;" the supporting pillar is called the "stipes," and the total of the cap, the "pileus." The spores are in all cases extremely minute, escaping, when the fungus is compressed, like smoke or dust.

The mushroom-like portion of the fungus being analogous, though remotely, to a flower, it is not surprising to find it in general very perishable. In many kinds it springs up in the course of a night, and dissolves next day, or at least with the first shower of rain; sometimes it is so delicate that it trembles in the hand when gathered, and, as in the *Aga'ricus radia'tus*, melts away even if breathed upon. There are species, however, that, growing upon old trees, acquire a perennial character, and become almost as hard as wood. Such is the case with the very curious and beautiful *Polypo'rus lu'cidus*, a plant found in all parts of the world, and attaining great perfection in New Brunswick. When fully developed, the sporiferous portion consists of a broad and nearly circular plate, 6—8 inches or more in diameter, an inch in thickness, in substance corky, the under-surface light tan-colour and minutely porous; the upper one, like the short lateral stem, of a fine reddish-brown, smooth and shining as if lacquered, and marked with broad concentric zones, like a shell. The parasitic forms of course perish with their victims, if not before. Their life is shortened also by the introduction of some kind of perfume, and almost as readily by immuring the attacked substance in a warm dry atmosphere.

Fungi are found in every part of the world, but as a class, they are

in tropical woods, comparatively rare; their
decaying organic matter, are in hot countries
the northern parts of Europe they are extrem
these in productiveness come the United Sta
according to Cooke's "Index Fungorum Brita
to no less than 3079, and it is certain that
named. Some kinds are rare, but hundred
The greater portion are autumnal; many ho
midwinter, and in early spring, when in the
dead branches of trees the beautiful *Pezi'za co*
cup,—a circular basin of the richest carmine
half in diameter. To the delight given hi
Fries, the great expositor of the Fungi, attri
to the study of this class of plants.

The student wishful to study these plant
Cooke's "Plain Account of the British Fung
the works of the Rev. M. J. Berkeley.
(vol. v. 1836) gives descriptions of 1487 sp
many volumes of coloured plates in public li

CCII. THE CHARA FAMILY

Insignificant but very curious aquatics, livi
growing principally in stagnant water. The
tremely slender, and consist either of long cy
placed end to end; or the one principal cell
of smaller ones of similar form, and dispo
manner. At the nodes, or points where th
are in contact, numerous slender branches ar
same manner as in the horsetails, and from
down slender roots. No leaves are produced,
may be represented by the smaller and ou
single-tubed species, constituting the genus
and transparent, and remain flexible after
compound tubes, constituting the genus *Cha'*
gray-green aspect, and usually opaque and o
their becoming incrusted with carbonate, or
lime, which possibly is secreted from within
after the manner of the silicious coat in the
tion is axillary and sessile, and consists of
staminiferous flowers; and of "nucules" repre

both usually produced upon the same plant, though some species are diœcious. The globules are brick-red, and when mature, burst into eight triangular valves, from which are thrown off minute filamentous "spermatozöids" or "zoöspores," with functions analogous to those of pollen; the nucules are ovoid or roundish, and have a covering of five or more spirally-wound tubes, which terminate in a crown of little teeth. The nucules becoming fertilized, are in due time cast into the water, where the spores, which are minute and striated, eventually germinate and produce new plants.

The affinities of the Characeæ have been a source of great perplexity. Linnæus placed them in his *Monœcia Monandria*. Other botanists have referred them to the *Naida'ceæ*, the *Hydrocharida'ceæ*, and the *Hippurida'ceæ*. It is now agreed that they are cryptogamic, and that their place should be near that of the Algæ, to some of which plants they are in respect of stems, not superior. I follow Lindley in locating them with the Thallogens, but the form of the spermatozöids is that of the higher classes, and they should stand perhaps near the mosses, especially as they have roots. They are remarkable among flowerless-plants in showing the phenomenon of the rotation of the cell-sap. The transparent *Nitel'las* are the best suited for observing it, and for the microscope there is no spectacle more pleasing, though inferior to that presented by the movement in the *Vallisne'ria*. Upwards of thirty species have been discovered; they grow in all parts of the world, and according to Mr. Babington, there are in Britain no less than sixteen. One of these, the *Nitel'la translu'cens*, often forms a pleasing object in mill-streams, looking like a mass of green and undulated velvet. The Charas are not uncommonly fœtid. It is to their great abundance in the stagnant waters of the Campagna of Rome, and the evolution of their offensive odour, that the unhealthiness of that celebrated region is largely owing.

CCIII. THE SEAWEED FAMILY.—*Algæ*.

Whatever their internal structure and philosophy, upon one point all Botanical Systems seem agreed, namely, either to begin or end with the simple aquatics called Seaweeds. It may be an appropriate finish to the survey of the world's riches in respect of plants, to stand, like Childe Harold at the end of his pilgrimage, on the shore of the sea, and muse at once upon the past, and on the new mysteries of the watery plain in front;—perhaps it is better that the survey should commence at this point instead of conclude—there is encouragement at least in the ancient fable, that it was the waves that gave birth to Venus.

Seaweeds, being Thallogens, are flowerless pl
present any contrast of stem or leaf, nor do a
and descending axis. Certainly there are huge
pillar of the plant is so thick as to resemble t
and in some of these is even prefigured the
parts proper to Exogens. There are others
distinct and regular foliage, and in these the l
traversed by what appear to be branching veins.
such organs or constituent portions really pres
provided with genuine roots. The variety o
simple, is almost endless. First we have th
purple and leather-like species, called "sea-wr
where from sea-bathed rocks, covered with
reddened relics of which, dried and hardene
successive high-water marks along the shore
those exquisite pink and rose-coloured sprays
sea-side may see in the shops, wrought into fa
or heaped together, with brown zoophytes,
these we gradually descend till the plant consis
formed of oblong cells joined end to end; in
race is represented almost as largely) we find
with microscopic forms that consist of no more
on damp terrestrial surfaces, the series ends wi
seem but specks of green embedded in mucu
habitat of course render the term Seaweed
reference to the species that occur exclusiv
term "Algæ" is now used in preference, the tr
"Marine Algæ," while the allied plants that
and ditches, and upon surfaces made moist by th
"Freshwater Algæ."

The classification of these singular plants
other Thallogens, partly upon the general
partly upon the peculiarities of the fructificat
sections, and the best understood, comprises t
from their predominant colour, *Rhodosper'me*
section belong those delicate species which
rose-coloured film, such as the *Delessé'ria sangu*
are tufted, several inches in length, lanceolate,
in the widest part about as broad as the litt
found the well-known and universal *Ploca'*

specimens of which have been preserved by amateurs than perhaps of all other seaweeds put together. The last-named distributes itself into an infinite number of minute branchlets, all ending in fine points, and when laid upon paper, seems a delicate red lace. Beautiful as they are when dried, it is only when floating in their native element that either the *Ploca'mium* or the *Delesse'ria* can be appreciated, and as thus beheld they are truly "flowers of the sea." All the Rhodospermeæ are fond of deep water, and especially of quiet bays and tide-pools; in number the class reaches close on 700 species. Here belongs also the little coralline so abundant upon every part of the coast, and the white relics of which attract every observant eye, not only in the delicacy of their bone-like joints, but in the almost stony hardness of their substance. The latter quality comes of the plant being completely encrusted with carbonate of lime—so thoroughly so as to seem a genuine coral.

The next important group is that represented in the common *Fuci* that hang from the rocks. These are in every case olive-green, and in substance cartilaginous. The dimensions they sometimes attain are almost incredible. In the Botany of the Antarctic expedition of Sir J. C. Ross, Dr. Hooker has given a representation of a submarine forest of *Lesso'nia* and *Macrocys'tis*, inhabiting the south circum-polar seas, in which the erect *quasi*-trunks are 5—10 feet high, while the horizontal growth ranges from 200 to 700 feet! In the middle of the Atlantic still lives and grows that famous submarine island of *Sargas'sum* that checked Columbus. Even upon our own coasts we may gather up specimens many yards long. The principal British representative is the *Fu'cus nodo'sus*, immediately recognised by its immense and abundant floats. *Fu'cus serra'tus* and *vesiculo'sus* are also very common.

The Tangles, constituting the important genera *Lamina'ria*, *Ala'ria*, and several others, form a different group again; as do likewise the very brilliant seaweeds called *Tao'nia* and *Padi'na*. The former constitute the section called *Phæospo'reæ;* the latter are the *Dictyota'ceæ.* These, like the preceding groups, have distinguishing peculiarities of fructification. The Taonia group, along with the Red Seaweeds, increase in a twofold manner. First they increase by the development of peculiar vegetative propagula termed "tetraspores," consisting of a parent-cell divided into four chambers, which, when liberated from the parent-plant, grow up into a new thallus;—secondly, by spores and antheridia. The Tangles appear to be of a more simple organisation; hitherto, at all events, they have been observed to multiply only by the liberation

of zoöspores from special cells. Not so the
be observed a most beautiful and wonderful
strictly analogous to that which takes place i
theridia and spore-sacs are both present, so
individual, sometimes on separate plants, an
declared beyond all doubt.

Many curious phenomena attach to the histo
and perhaps all of the *Lamina'rias*, instead of
do, by the development of new substance at th
from the base, the older portion being pushed
of the corresponding part of the finger-nails.
kind of autumnal defoliation, as in certain s
Polysipho'nia, which in summer are well clot
branchlets, that lengthen as the season advan
with the approach of winter, leaving bare ste
spine-like stumps. The summer and winter a
are not more different than those produced i
by the changes of the seasons.

The Freshwater Algæ are represented chief
called *Conferva'ceæ*, many of the species of wh
in pools and ditches, consisting of chains of c
and lucid green, and though frequently as
such vast numbers as to charge the water
These plants are not confined, however, to f
bright-green *Ul'va* of the seashore belongs to
microscope these little organisms present the
forms, often reminding us, as in the case of th
and ferns, yet totally different from both, an
parts peculiarly their own. Every stream an
or less of the *Conferva'ceæ;* they hang from the
stone in the shape of "silk-weeds," and when
contemptuously called "green-slime," it is thr
cell-chains, more exquisitely fabricated than

Smaller yet, and still more extraordinary,
life-history, are two other races which it is
distinguish as the *Desmidia'ceæ* and the *Dia*
these consist of only one or two cells, with a
like outline, and greener than the freshest gra
a peculiar golden-yellow or brownish hue, and
cylindrical, or prismatically quadrangular, or

canoes. They are found in the greatest abundance in shallow water upon moors and heaths, in the scum of shallow ditches, and at the edges of ponds, and for the microscope are beautiful beyond expression. Viewing them for the first time we almost mistrust our eyes. The *Desmidia'ceæ* consist only of vegetable matter. The *Diatoma'ceæ* possess in addition a prismatic flinty skeleton or frame, destructible neither by red-heat nor by decay. Place a few of them upon a bit of platinum-foil over the flame of a spirit-lamp, and after all the organic matter has been destroyed, the silicious shell remains intact, and owing to the removal of the former, sharply and clearly defined. Take care, however, that no salt of potash or soda be present, or it will enter into chemical combination with the silica, and produce an atom of glass, while the object disappears. Some of the most frequent and easily procurable forms, as well as extremely beautiful, are those comprised in the genera *Micraste'rias*, *Cosma'rium*, *Euas'trum*, *Desmid'ium*, and *Pedias'trum*. The mode of propagation is principally by subdivision of the parent-cell into two. The increase is often astonishingly rapid; both kinds are also remarkably tenacious of life, and though soon destroyed by drought, allow of being transported by the wind, if the atmosphere be damp, to the castle-turret and the mountain-top.

Besides these again are some singular species possessing the power of self-movement, and which, like certain Desmids and Diatomaceæ, have been claimed by zoologists as of animal nature rather than vegetable. Such are the *Oscilato'rias*, and the *Vol'vox globa'tor*, the latter of which is considered the type of a family called *Volvocin'eæ*. This truly wonderful little organism exists in millions in certain ponds, though sometimes the adjacent ponds do not contain a single specimen. When a drop of water from one of these ponds is placed in the field of the microscope, it is found to be inhabited by green spheres that keep rolling over and over, never in confusion, never coming in contact, every one of them laced elegantly with darker lines, and containing two or three nuclei. When Scipio was shown the celestial orbs revolving through space, and called upon to listen to their immortal music, the spectacle was grander, but could not be more exquisite, than that of these tiny globules in their harmonious movement, that fascinates the eye as if it were enchantment. The binocular microscope should be used, as with a single-tube instrument the rotundity and the idea of depth are not preserved. What Ehrenberg describes as animalcules in the Volvox, are the endochromes of the component cells, reduced to a small bulk by the secretion of a hyaline substance between the internal cell-membrane and

the outer cell-wall. The cilia described by th
ing to the individual animalcules, are really
covering of the organism. The spores are pro
that are seen embedded in the respective e
form of which latter comes of the primordial
to the outer integument at various points, t
and neighbouring cells coming in contact.

Further information respecting the Algæ is
the present, nor would it be desirable to in
devoted especially to flowering-plants. The fi
of them is a good microscope, and along with t
books specially devoted to the subject. Ma
and figured with great accuracy and artistic
great work on these plants, 8 vols. 8vo. In de
may usefully commence with Dr. Landsborou
On Freshwater Algæ, there is Mr. Hassall's
for the two other principal tribes, Smith's "
Ralfs' "Desmidieæ," also very copiously ill
"Hand-book of the Microscope and Microsco
some useful directions how to find and exam
of British marine Algæ is about 370. How n
others is not yet known, but it is certain that
will be a long one.

GLOSSARY.

Terms derived from the Greek language are marked •.

The terminations *inus* and *oides* signify "likeness" or "resemblance."

ABNORMAL, contrary to usual structure.

ABORTION, imperfect development.

•ABRUPT (leaf), see p. 19.

ABRUPTLY-PINNATE (leaf), when a pinnate leaf has no odd one at the extremity, as in Cassias.

•ACAULIS, stemless, *i.e.*, having so short a stem as to seem destitute of one.

ACETOSUS, A, UM, ELLA, sour.

•ACHENIUM, a seed-like fruit. See p. 45.

•ACHLAMYDEOUS, without either calyx or corolla.

ACICULARIS, needle-shaped.

•ACOTYLEDONOUS, destitute of seed-leaves or "cotyledons."

•ACOTYLEDONS, flowerless-plants; the same as Cryptogamia.

ACRIS, E, biting to the taste.

•ACROGENS, flowerless-plants; the same as Cryptogamia.

ACULEATUS, A, UM, armed with minute prickles.

ACUMINATE (leaf), see p. 19.

ACUTE, ACUTUS, A, UM, tapering gradually to a slender, but not to a prickly or thorny point.

ADVENTITIOUS (buds), see p. 159.

AERIAL, growing perched upon the stems of other plants, as opposed to having roots in the ground.

——— growing or partly so, in the air, as opposed to living wholly in the water.

ÆRUGINOSUS, verdigris-coloured.

ÆSTIVALIS, E, belonging to or coming in the summer.

ÆSTIVATION (of flower), see p. 25.

ÆSTIVUS, A, UM, the same as ÆSTIVALIS.

AFFINIS, literally "related to," but in sense "doubtful" or "obscure."

AGGREGATE, when a number of little flowers or fruits are placed side by side, so that none can be removed without impairing the unity of the mass.

AGRESTIS, E, growing in waste and ploughed land.

•AIZOIDES, having rosulate foliage like that of the Aizoon or house-leek.

ALATUS, A, UM, furnished with a membranous wing.

ALBESCENS, ALBIDUS, A, UM, whitish, or dirty white.

ALBUMEN (of seed), the white matter stored up in the seed for the nourishment of the embryo when it germinates.

ALBUMINOUS (seeds), those that contain free or separate albumen.

ALBUS, A, UM, white.

ALLIACEOUS, smelling like garlic.

ALLIANCES of plants, see p. 59.

ALPESTRIS, E, the same as *alpinus*.

ALPINUS, A, UM, growing on mountains in cold countries.

ALTERNATE LEAVES, see p. 21.

ALTERNIFLORUS, having the flowers disposed alternately upon the stalk.

ALTERNIFOLIUS, having alternate leaves.

AMABILIS, E, lovely.

AMARUS, A, UM, bitter.

AMBIGUUS, A, UM, uncertain or doubtful.

AMPLEXICAULENT (leaves), see p. 10.

ANCEPS, having a two-edged stem or seed-pod.

ANFRACTUOSE (anthers), sinuous, as in a gourd.

ANGLICUS, A, UM, native of England.

ANGULAR, ANGULARIS, E, having longitudinal edges or corners, like a prism. The reverse of "terete."

anciently so called.

*APETALOUS, destitute of petals.

APEX, the very top or summit.

*APHYLLUS, A, UM, destitute of lea

*APOCARPOUS (fruits), when the o or carpels are all free and distin

*APOPETALOUS, having the petals

*APOTHECIA (of lichens), see p. 82

APPRESSED, placed flat upon the s of something else, and lying in contact with it, as when leave their upper surfaces pressed a the stem.

AQUATIC, AQUATICUS, A, UM, livi water.

AQUATILIS, E, living *under* water.

ARBORESCENT, tree-like.

ARBOREUS, A, UM, having a perm woody stem.

*ARCTICUS, A, UM, native of the frigid zone.

ARCUATUS, A, UM, bent like an archer'

ARENARIUS, A, UM, growing in places, especially upon the sea-

ARGENTEUS, A, UM, silvery-lookin

ARILLUS, see p. 182 and p. 622.

ARISTATUS, A, UM, having awns. See

ARMED, provided with spines, pri or thorns. See p. 282.

ARROWSHAPED (leaf), see p. 12.

ARTICULATED, jointed.

ARTICULATION, a joint.

ARVENSIS, E, growing in ploughed f

ASCENDING (stems). A stem is so c that is horizontal when it leave

•**Bryology**, the science which treats of mosses.

Buds, the axillary or terminal protuberances on the stems, in which are contained the young unfolded leaves and other parts.

Bulbous (roots), see p. 7.

Butterfly-shaped (flower), see p. 239.

Caducous (sepals), such as fall off before the petals are fully expanded, as in the poppy,

Cælestis, **e**, and **Cæruleus**, **a**, **um**, sky-blue.

Cæsius, **a**, **um**, grayish lavender-coloured.

Cæspitosus, **a**, **um**, growing in dense tufts or patches.

Calcaratus, **a**, **um**, having a spur.

Calcareus, **a**, **um**, growing in, or fond of earth containing lime.

Calyculatus, **a**, **um**, furnished with a small outer calyx.

•**Calyptrate**, having a conical cap.

•**Calyx**, see p. 26.

Cambricus, **a**, **um**, native of Wales.

Campanulate, bell-shaped.

Campestris, **e**, growing in the open fields.

Candidus, **a**, **um**, pure white, but not of the whiteness of snow.

Canescens; **canus**, **a**, **um**; hoary.

Caninus, **a**, **um**, belonging to or only fit for dogs.

Capillaceus, **a**, **um**, of the nature or consistence of a hair,

Capillaris, **e**, resembling a hair in tenuity.

Capitate (inflorescence), growing in a head. See p. 40.

——— (stigma), round, like the head of a pin, as in the primrose.

Capreolatus, **a**, **um**, scrambling among other plants.

Capsule, a kind of seed-pod. See p. 45.

Carinatus, **a**, **um**, having a longitudinal ridge, like the keel of a boat.

Carneus, **a**, **um**, flesh-coloured, or of the very palest rose-colour.

Carnosus, **a**, **um**, of a fleshy consistence.

•**Carpels**, see p. 44.

•**Carpology**, the science which treats of the fruits or seed-pods of plants.

•**Carpophore**, see p. 526.

Catkin, see pp. 41 and 569.

Caudatus, **a**, **um**, having or resembling a long tail.

Caudex (of the root), see p. 7.

Cells, the soft substance of plants is composed of minute bags called cells.

——— (of the anthers), the boxes that contain the pollen.

——— (of the ovary), see p. 28.

Cellular tissue, see "cells."

Cellulares, plants formed only of cellular tissue, such as Fungi.

Centrifugal (inflorescence), see p. 42.

Centripetal (inflorescence), see p. 42.

Cerasin, see p. 270.

Cernuus, **a**, **um**, half-pendulous or nodding.

•**Chalaza** (of the seed), the part where the nucleus is joined to the integuments.

•**Chamæ**, dwarf, or a miniature representation or reminder of, *e.g.*

•——— **drys**, dwarf oak.

•——— **morus**, dwarf mulberry.

Channeled, hollowed lengthways, like a gutter.

•**Chloranthus**, **a**, **um**, greenish-white.

Cilia, minute hairs, set in rows along the edges of leaves and other parts, like the eyelashes along the margin of the eyelid.

Ciliated, **Ciliaris**, **Ciliatus**, **a**, **um** (leaf), see p. 19.

Cinereus, **a**, **um**, the colour of wood-ashes.

Circinalis, **Circinate**, rolled or curved inwards. See pp. 41 and 779.

Circinatus, properly "circinate," but also injudiciously applied to leaves having a circular outline.

Circular, round in outline, and flat on both surfaces, like a piece of money.

Citrinus, **a**, **um**, citron-yellow colour.

Clavatus, **a**, **um**, bearing little clubs.

Claviculatus, **a**, **um**, scrambling by means of little tendrils.

Coccineus, **a**, **um**, scarlet, *i.e.*, carmine tinged with yellow.

Cœnosus, **a**, **um**, growing in mud or miry places.

Collective (fruits), such as stand in close neighbourhood upon a common receptacle, but without any organic conjunction, as in the buttercup.

Collinus, **a**, **um**, growing upon hills.

Coloured, of any hue except *green*, which colour is in botany always spoken of under its own name.

Comosus, **a**, **um**, very hairy, or leafy, so as at a distance to resemble or suggest the idea of a head of hair.

Communis, **e**, found everywhere.

are conjoined by their bases.

Connivent, approaching close

Cordate, heart-shaped in gen line.

Coriaceous, of a leathery textu

•Cormogens, see p. 54.

•Cormus, see p. 8.

Corniculatus, a, um, having point like a horn.

Corolla, see p. 23.

Cortex, the outer bark of the s

Cortical, of or belonging to th

•Corymb, see p. 40.

•Cotyledons, the rudimentary in the seed. See p. 46.

Crassifolius, a, um, thick-leave

Creeping (stem), see p. 8.

•Cremocarp, see p. 526.

Crenate (leaf), see p. 18.

Crenulate, very delicately cren

Crinitus, a, um, having tufts weak hairs growing from d parts of the surface.

Crispus, a, um, very irregularly lated upon the surface, or alo margin.

Cristatus, a, um, having a tuft o

Croceus, a, um, saffron-coloured.

Cross-shaped (flower), see pp. 2

Cruciatus, a, um, having the pa posed crosswise, like the four a weather-vane.

Cruciform (flower), see pp. 25,

Crustaceous (testa of seed), th brittle, like egg-shell.

•Cryptogamia, flowerless-plants

*Dimorphous, appearing under two different forms. See p. 780.

*Diœcious, having the stamens and pistils in different flowers, and each kind of flower upon a different individual.

Discolor, of a different colour above and below.

Disk, an expanded cushion found at the base of the ovary in certain flowers.

—— also applied to the central portion of compound-flowers.

Dissectus, a, um, very finely divided and subdivided.

Dissepiment, a partition in a seed-pod.

Distant, parts of plants and of flowers are called "distant" when further apart than usual.

*Distichous, growing in two opposite and vertical ranks.

Divaricatus, a, um, straddling.

Divergent, spreading away from one another.

Diversifolius, a, um, having leaves of two or more shapes.

Divided (leaves), see p. 14.

Domesticus, a, um, cultivated for household use.

Dorsal, belonging to the back or under-surface.

Dotted (leaves), see p. 21.

Double (flowers), see p. 34.

——— (perianth), see p. 26.

Doubly-pinnate (leaf), see p. 13.

——— pinnatifid (leaf), see p. 17.

Drupaceous, drupe-like.

Drupe, Drupeola, a kind of fruit. See pp. 45, 270, 282.

Dumetorum, growing in bushy places.

Duriusculus, a, um, "durus" in a less degree.

Durus, a, um, hard, stiff, rigid.

Echinatus, a, um, prickly, like a hedgehog, as the husk of the Spanish chesnut.

Effusus, a, um, widely-spreading, like *diffuse*.

Elatus, a, um; elatior; tall, taller, *i.e.* than their particular organs would have led us to expect.

Elliptical (leaves or petals), broad in the middle, and pointed at each extremity.

Elongatus, a, um, when the parts are drawn out to a greater length than is usual.

Emarginate, notched at the end or apex.

*Embryo, the rudimentary plant contained in the seed. See p. 46.

*Endecandrous, having eleven stamens.

*Endocarp (of fruit), the hard and stony part, as in a plum-stone.

*Endogens, see pp. 49, 53.

*Enneandrous, having nine stamens.

Entire (leaves or petals), see p. 18.

——— (ovary), when with an unbroken surface, having no lobes or divisions.

*Epicarp, the outermost skin of a fruit.

*Epidermis, the outermost skin.

*Epigynous (stamens), see p. 30.

*Epipetalous (stamens), so completely adherent to the inner surface of the petals, as to appear to grow from and upon them.

*Epiphytes, see p. 652.

Equitant (leaves), see p. 646.

Evergreen (leaves), see p. 22.

Excelsior, taller than is usual in its race or genus.

Excelsus, a, um, very tall.

Exiguus, a, um, very puny and pitiful.

Eximius, a, um, very grand and glorious.

*Exogens, see pp. 49, 50.

Exserted (stamens), protruded outwards.

Exstipulate (leaves), destitute of stipules.

Falcatus, a, um, shaped like a sickle, with its handle.

Families (of plants), see p. 57.

Fan-lobed (leaf), see p. 17.

Fan-veined (leaf), see p. 20.

Farinosus, a, um, covered with a mealy powder.

Fascicle, see p. 40.

Fascicularis, Fasciculatus, a, um, borne in fascicles.

Fastigiatus, a, um, having the branches all vertical, like a Lombardy poplar.

————— also "level-topped."

Fatuus, a, um, worthless, insipid.

Feather-lobed (leaf), see p. 16.

Feather-veined (leaf), see p. 20.

Female (flowers), those that contain pistils only.

——— (plants), those that bear flowers containing pistils only.

Ferrugineus, rust-coloured, *i.e.*, light brown, with a little mixture of red.

Fibrous (roots), consisting only of threads.

Filament (of stamen), see p. 29.

Filiform, filiformis, e, slender as a thread or *filum*.

Fimbriatus, a, um, fringed.

Fistular, fistulosus, a, um, hollow like a pipe.

FLORIBUNDUS, A, UM, free-flower

FLOWERLESS-PLANTS, see pp. 47

FLUITANS, floating on the su
water.

FLUVIATILIS, E, growing in or u
margin of rivers and streams

FOLIACEOUS, of the texture of
green leaves.

FOLLICLE, a kind of fruit. See

FONTANUS, A, UM, growing in o
side of natural fountains or
of water.

FORAMEN, the aperture in the
the ovule, through which the
tube passes to the nucleus.

FORK-VEINED (leaf), see p. 20.

FORMOSUS, A, UM, strikingly bea

FRAGILIS, E, brittle.

FREE, not adhering to adjacent

FROND, properly, the green pa
fern. The term is also ap
other flowerless plants, and
Lemna. See p. 777.

FRUIT, the ripened seed-pod of
and its contents.

FRUTESCENS, FRUTICOSUS, A, UM, s

FRUTICULOSUS, A, UM, under-shr

FUGITIVE (flowers), soon falling t

——— (petals), soon falling o

FULGENS, very brilliant and glit

FULIGINOSUS, dirty brown, vergi
black.

FULVUS, A, UM, tawny-coloured.

FUNGOID, resembling a mushr
texture or substance, and be

Hispidus, a, um, covered with long and very harsh hairs.

Horni, shoots of the present year. **Hornum**, producing flowers on such shoots.

Hortensis, e, cultivated in gardens.

Humifusus, a, um, spreading low upon the ground.

Humilis, e, humble and unpretentious, compared with its congeners.

•**Hybrid**, a plant resulting from the fecundation of one species by another.

Hyemalis, e, coming in the winter, or enduring through the winter.

•**Hymenium** (of fungi), see p. 829.

•**Hyperboreus**, a, um, inhabiting northern latitudes.

•**Hypogynous** (stamens), see p. 30.

Ibericus, a, um, native of Spain.

Imbricated (leaves), see p. 22.

———— (sepals and petals), when the edges lap over one another while young.

Imperfect (plants), see pp. 5, 40.

Incanus, a, um, hoary with white down or other delicate covering.

Incisus, a, um, cut or cleft.

Incomplete (flowers), see p. 37.

Incurved, coiled inwards. See p. 41.

Indehiscent (fruits or seed-pods), not opening spontaneously when ripe, so as to discharge the seeds or let them escape.

Indigenous, truly and aboriginally native.

Indusium (of ferns), see p. 781.

Inferior (ovary), see p. 29.

Infestus, a, um, troublesome as a weed.

Inflatus, a, um, distended like a blown bladder.

Inflorescence, see p. 39.

Insignis, e, noble, admirable, conspicuous.

Integrifolius, a, um, having "entire" leaves.

Internodes, see p. 8.

Interpetiolar, between the bases of the petioles of opposite leaves.

Interrupted, when there are irregular intervals between parts generally continuous or adjoining.

Interruptedly-pinnatifid (leaves), see p. 280.

Inundatus, a, um, growing in places often overflowed.

Involucel, see p. 527.

Involucrum, a whorl of bracts. See p. 527.

Involute, **Involutus**, a, um, coiled inwards, like a roll of ribbon.

Irregular (flowers), see p. 24.

Irriguus, a, um, growing in wet and plashy places.

•**Isomerous** (flowers), having the sepals, petals, and stamens all of the same number, as in a primrose.

Japonicus, a, um, native of Japan.

Junceus, a, um, resembling rushes.

Labiate (corolla), see p. 377.

Laciniated, irregularly cut into narrow segments.

Lactescent, yielding milky juice.

Lacteus, a, um, milk-white.

Lacustris, e, growing on the borders of lakes.

Lævigatus, a, um, having a smooth and polished surface.

Lævis, even, smooth, and level. See "smooth."

Lamina (of leaf), see p. 10.

•**Lamprocarpus**, a, um, shining-fruited.

Lanatus, a, um, woolly upon the surface.

Lanceolate (leaf), see p. 12.

Lateral, arising from the side.

Lateritius, a, um, the colour of new bricks.

Latifolius, a, um, broad-leaved.

Legume, a kind of seed-pod. See pp. 45, 239.

Lenticular, shaped like a double-convex lens.

•**Leucostachys**, white-stalked, or white-flowered.

Ligneous, woody in texture.

Ligulate (florets), see p. 37.

Ligule, see p. 708.

Limb, the broad flat part of a leaf or petal.

Limosus, a, um, growing in muddy places.

Linear, long and very narrow, like a blade of grass. See p. 12.

Lineatus, a, um, marked with lines or streaks.

Lingulatus, a, um, shaped like a tongue, *i.e.*, much longer than broad, obtuse at the extremity, flat, and with parallel margins.

Littoralis, e, growing on the seashore.

Lobed (corolla), see p. 24.

——— (leaves), see p. 14.

Lucidus, a, um, shining.

Lunate, crescent-shaped.

Lusitanicus, a, um, native of Portugal.

Luteolus, a, um, yellowish.
Luteus, a, um, yellow.
Lyrate (leaf), see p. 16.

•Macrophyllus, a, um, long or large-leaved.
Maculatus, a, um, spotted.
Magnus, a, um, great.
Major, larger than others of similar kind.
Majus, large.
Male (flowers), such as contain stamens only.
—— (plants), such as bear flowers that contain stamens only.
Margaritaceus, resembling pearls.
Marginatus, a, um, having the edge or margin of a different colour or different texture.
Maritimus, a, um, growing by the sea-side.
Masculus, a, um, male or masculine.
Maximus, a, um, the largest of its tribe or genus.
Membranous, thin, dry, and semi-transparent.
•Mericarp, see p. 526.
•Microphyllus, a, um, having very small leaves.
Midrib (of leaf), see p. 20.
Minus, minor, minimus, a, um, little, less, least.
Mollis, e, soft, with fine and delicate hairs, like velvet.
•Monadelphous (stamens), see p. 240.
•Monandrous, having only one stamen.
Moniliform, resembling a necklace.
•Monochlamydeous, having only one floral envelope, or only a calyx.
•Monoclinous, the same as bisexual.
•Monocotyledonous, having only one seed-leaf to the embryo.
•Monocotyledons, Endogens.
•Monœcious, having the stamens and pistils in separate flowers, but on the same tree or plant. See p. 569.
•Monogynous, having only one pistil.
•Monopetalous, having the petals combined into a cup or tube, as in the convolvulus. See p. 24.
•Monosepalous, having the sepals combined into a cup or tube, as in the calyx of the primrose.
Montanus, a, um, growing upon mountains.
•Morphology, the science which treats of the unity of organs. See p. 353.
Moschatus, a, um, smelling like musk.
Mucronate, having a minute thorn at the extremity.

Mule, a
fecunda
plant wi
The sa
Multicau
Multifid
divided.
Multiflo
Multiple
Muralis,
Muricatu
prickles
Murinus,
walls.
Murorum,
walls.
Muscolog
of mos
compou
imprope
ology.)
Mutabilis
diversity
•Myceliu
•Mycolog
Fungi.

Nanus, a,
Natans, s
Natural c
as " Fa
•Nectary,
See p. 3
Nemoralis
groves.
Nemorosu
as *nemo*
Net-veine
Nidus, a n
suitable
Nidus-avis
Niger, ni
nigrica
Nitens, br
Nitidus, a
Nivalis, e
near sno
Niveus, a,
Nobilis, e
Noctiflor
opening
or after
Nodes, th
p. 8.
Nodiflor
close to
Nodosus,
Nucleus,
of new

Nudi (in composition), naked, *i.e.*, destitute of leaves where usually present, as nudicaulis, nudiflorus.

Nudus, a, um, destitute of hairs.

Nutans, nodding or half-pendulous.

Obcordate (leaf or petal), inversely heart-shaped, *i.e.*, having the smaller extremity attached to the stalk.

Obovate (leaf), see p. 12.

Obtuse, rounded or blunted at the extremity.

Occidentalis, e, native of, or coming from western countries, especially North America.

•Ochroleucus, a, um, cream-coloured.

Ocrea, a kind of stipule. See p. 216.

Odoratus, a, um, sweet-smelling.

Officinalis, e, sold in the druggists' shops, or formerly so.

Oleraceus, a, um, useful as an esculent pot-herb.

Olidus, a, um, having a strong and unpleasant smell.

Olitorius, a, um, same as *oleraceus.*

Opposite (leaves), see p. 21.

Organs (of plants), the root, stem, leaves, and other parts.

Orientalis, of or from the southern parts of Asia.

Oval (leaf), see p. 12.

Ovary, the rudimentary or incipient seed-pod. See p. 28.

Ovate (leaf), see p. 12.

Ovinus, a, um, pertaining to sheep.

Ovoid (head of flowers), of the solid form of an egg.

——— (fruit), the same.

Ovules, the rudimentary seeds contained in the ovary. See p. 28.

Pallescens, pale yellowish-green.

Palmate (leaf), see p. 17.

——— (root), having lobes or divisions resembling fingers.

Paludosus, a, um, and palustris, e, growing in marshy places.

Panicle, see p. 41.

Paniculatus, a, um, bearing the flowers in panicles.

•Pantothrix, hair-like throughout.

Papilionaceous (corolla), the same as "butterfly-shaped." See p. 240.

Papillosus, a, um, covered with pimples.

•Pappus, see p. 427.

Parallel-veined (leaves), see p. 20.

•Parasites, plants that prey upon other plants. See p. 172.

Parietal (placenta), attached to the walls or interior surface of the ovary.

Parviflorus, a, um, small-flowered.

Parvifolius, a, um, small-leaved.

Patens, spreading wide open.

Patulus, a, um, spreading abroad upon the ground.

Pectinate (leaf), see p. 16.

Peduncle, pedicel, see p. 39.

•Peloria, see p. 398.

Peltate, formed like a shield, with the stalk in the centre of the circle.

Pennatus, a, um, feather-like.

•Pentamerous (flowers), see p. 34.

Perennial, perennis, e, living many years. See p. 10.

Perfect plants, see p. 5.

Perfoliate (stem), the condition produced when opposite leaves are connate, or the auricles of an amplexicaulent leaf become united. The stem then appears to pass through.

•Perianth, see p. 31.

•Pericarp, seed-pod.

•Perigynous (stamens), see p. 30.

•Peristome (of mosses), see p. 816.

Permanent (calyx or corolla), see p. 27.

Perpusillus, a, um, very small and weak.

Persistent (calyx or corolla), the same as "permanent."

Personate (corolla), formed like the muzzle of a quadruped.

Perules, see p. 572.

•Petaloid, of the texture of petals.

•Petals, see p. 24.

Petiolate, see p. 10.

Petiole (of leaf), see p. 10.

•Phænogamia, •phanerogamia, flowering plants. The reverse of "Cryptogamia."

•Phyllodia, see p. 242.

Pictus, a, um, richly covered with many hues, as if painted.

Pileus, the convex part of a mushroom or toadstool.

Pilosus, a, um, softly hairy.

Piluliferus, a, um, bearing little globular heads resembling pills.

Pinnæ (of a compound leaf), the same as "leaflets."

Pinnate (leaf), see p. 13.

Pinnatifid (leaf), see p. 16.

Pinnules (of ferns), see p. 778.

•Pistil (of the flower), see p. 28.

•Pistillidia, see p. 782.

Pith, the soft, white, spongy substance which fills or constitutes the interior of young stems.

Placenta, the internal part of the ovary to which the ovules are attached.

Plicatus, a, um, plaited or folded, while young, like a lady's fan.

Plumule (of germinating seed), see p. 46.

Poeticus, celebrated by the poets of ancient Greece and Rome.

Pollen, see p. 30.

•**Polyadelphous** (stamens), united by the filaments into three or five sets or "brotherhoods."

•**Polygamous**, when some of the flowers of a plant have stamens only, and others only pistils, while others again are possessed of both.

•**Polymorphus**, a, um, presented under many different aspects.

•**Polypetalous**, see p. 24.

•**Polyrhiza**, having many roots.

•**Polysepalous**, a calyx having many and distinct sepals.

•**Polyspermus**, a, um, producing abundance of seed.

•**Polystachyon**, having many stalks.

Præcox, early in blossom, soon ripe.

Prælongus, a, um, lengthened.

Pratensis, e, growing in the meadows.

Prickles, hairs grown very thick and strong, and sharp at the points. See p. 282.

Prismatic (calyx), tubular, with sharp vertical angles.

Procumbent (stem), see p. 8.

Proliferous (flowers), when a small and supplementary flower grows out of the centre of another; or a number grow round the edge of the principal one, as in the "hen-and-chickens" daisy.

——— (plant), one that sends out many running shoots, establishing new plants, like a strawberry.

•**Prothallus** (of ferns), see p. 782.

•**Pseudo-**, spurious or sham.

•**Pteridology**, the science which treats of Ferns.

Pubescent, downy with abundance of short fine hairs.

Pulchellus, a, um, pulcher, pulchra, pulchrum, fair or beautiful.

Pulicaris, resembling fleas.

Pullus, a, um, raven-black.

Pulverulent, covered with fine powdery matter.

Pulvinatus, a, um, when several parts are so pressed together as to form an eminence or pillow.

Pumilus, a, um, little; dwarfish, compared with its congeners.

Punctatus, a, um, dotted.

Puniceus,
Purpureus,
blue.
Pusillus, a
Pyriform,

Quadrangu
four-corn
Quasi, liter
prefix, si
Quasi-digit
digitate l
Quasi-pinn
nate leav
Quinate (le

Raceme, se
Racemosus
racemes.
•**Rachis**, th
cence of
——— in
Radiant (
circumfe
larger th
spread o
wild gue
Radical, s
as to see
radix.
Radicans,
of prostr
Radicatus,
Radicle, t
from a g
Ramosus,
branches
•**Raphides**
the cells
Receptacl
Rectus, a,
Recurved,
ing man
Reflexus,
Regular (
Reniform,
Repens, r
ground,
Resupinat
upside d
stalk; th
becomin
Reticulat
work.
Retroflex
and dow
Revolute,
•**Rhizome**,
•**Romboi**
broader

Ribbed (leaf), see p. 20.
Rigid; **Rigidus**, a, um, stiff and straight, but not necessarily erect.
Riparius, a, um, and rivalis, e, growing on the banks of rivers.
Rosaceous (corolla), see pp. 25 and 283.
Roseus, a, um, rose-coloured.
Rotate, (corolla), see p. 317.
Rotundifolius, a, um, round-leaved, *i.e.*, flat and with a circular outline.
Rubens, turning red.
Ruber, rubra, rubrum, red.
Rubiginosus, a, um, rust-coloured.
Rufescens, **Rufus**, a, um, brownish-red, or becoming so.
Rugosus, a, um, wrinkled or coarsely crumpled.
Runcinate (leaf), see p. 16.
Runners, long prostrate stems, like those of the strawberry.
Rupestris, e, growing upon rocks.
Rutilans, glittering.

Saccharatus, a, um, **Saccharinus**, a, um, having sugary juice or sap.
Sagittate (leaf), arrow-shaped. See p. 12.
Samara, a kind of winged fruit, such as that of the maple and elm.
Sanguinalis, e, causing effusion of blood.
Sanguineus, a, um, blood-coloured.
Sarmentosus, a, um, having long shoots.
Sarniensis, e, native of, or belonging to, the Channel Islands.
Sativus, a, um, proper for cultivation.
Saxatilis, e, living upon or among rocks.
Scaber, bra, brum, covered with short and very stiff hairs or asperities.
Scabriusculus, a, um, covered with stiff but very short hairs, or asperities.
Scales, imperfectly developed leaves, or bract-like substitutes for them. The name is also applied to the bracts of such flowers as grasses.
Scandens, climbing by any means except twining.
Scape, a leafless flower-stalk, arising from the centre of a tuft of radical leaves. See p. 39.
Scattered (leaves), see p. 21.
Scarious, like "membranous," but thinner, drier, and more shrivelled.
Sceleratus, a, um, very hurtful; poisonous.
Scion, a young shoot.
Scoparius, a, um, fit for making besoms.
•**Scorpioides**, "circinate."
Scutatus, scutellatus, a, um, resembling a shield.
Secund, all turned to one side, and looking in one direction. See p. 42.
Segetum, growing in cornfields.
Segments, see p. 14.
Semperflorens, always in blossom.
Sempervirens, evergreen.
•**Sepals** (of calyx), see p. 26.
Sepium, growing in the hedges or upon the hedgebanks.
Septa, transverse partitions. **Septum**, one such partition.
Septate (leaf), see p. 14.
Sericeus, a, um, silky.
Serotinus, a, um, flowering later in the season than others of its kind.
Serrated (leaf), see p. 18.
Serrulate, **Serrulatus**, a, um, having very minute serratures or teeth along the margin.
Sessile, destitute of a stalk. See p. 10.
Sessiliflorus, a, um, flowers having no stalks.
Sessilifolius, a, um, leaves having no stalks.
Setaceus, a, um, shaped like bristles.
Setosus, a, um, covered with bristles or strong straight hairs.
Shrub, see p. 10.
Silicle and silique, forms of seed-pods. See p. 133.
Simple (flowers), see p. 23.
——— (leaves), see p. 13.
——— (stems), unbranched. See p. 9.
Sinensis, e, native of China.
Single (flowers). Flowers in their natural condition.
Sinuatus, a, um, wavy along the margins.
Smooth (surface), when not only glabrous, but free from any kind of inequalities, such as furrows or pimples.
Solid (stems), filled up with pith or other matter; the reverse of "hollow."
Somniferus, a, um, sleep-producing.
Sori, of ferns. See p. 780.
•**Sorosis**, see p. 691.
•**Spadix**, see pp. 41 and 696.
•**Spatha**, see pp. 43 and 696.
Spathulatus, a, um, rounded at the apex, and tapering towards the base. Said of certain leaves.
Spawn, see p. 828.
Species, see p. 49.
Speciosus, a, um, very handsome and ornamental.
Spectabilis, e, the same as "speciosus."
Spicate, spicatus, a, um, bearing the flowers in spikes.

Spike, see p. 41.

Spikelets, small clusters of flowers, in grasses, &c.

Spines, see p. 282.

Spinosus, a, um, armed with spines.

Spinulosus, a, um, spinous in a very delicate degree.

Spiral, spiralis, e, twisted, or twisting, like a corkscrew.

Splendens, very showy and handsome.

Spongioles (of roots), see p. 7.

•**Spores or sporules**, the seeds of flowerless-plants. See p. 777.

Stamens (of the flower), see p. 29.

Stellatus, a, um, stellulatus, a, um, arranged like a star.

Stem, see p. 8.

Stemless, see p. 10.

•**Stigma**, a part of the pistil, see p. 28.

Stings, stiff, sharp-pointed hairs, rising from a bag of venom, a portion of which latter is conveyed into the wounds they make, as in the nettle.

Stipes, a stem, usually restricted to ferns and fungi. See p. 777.

Stipitate, provided with a little stalk, usually restricted to ovaries that are so provided.

Stipules (of leaves), see p. 21.

•**Stomates**, see pp. 22 and 158.

Striatus, a, um, marked with very fine parallel ridges.

Strictus, a, um, growing quite and stiffly erect.

Strigosus, a, um, covered with rough, strong, appressed hairs.

———— lank, scraggy, meagre.

•**Style**, a part of the pistil, see p. 28.

Suaveolens, sweet-scented.

Suberosus, a, um, having a corky texture.

Subulatus, a, um, shaped like a cobbler's awl.

Succisus, a, um, cut off abruptly.

Succulent, unusually juicy or distended with sap.

Suckers, shoots which arise from the root, and either rise vertically into the air, or spread along the ground and take new root.

Suffrutescent, Suffruticose, undershrubby.

Sulcatus, a, um (stem), furrowed.

Superior (ovary), see p. 29.

Suture, a join or seam, as in the unopened pod of a pea.

Sylvaticus, a, um; sylvestris, e, growing in woods.

•**Symmetric**
nify that
mens of a
•**Sympetalo**
•**Syncarpou**
are unite
•**Syngenesi**
tically, or

Tectorum,
roofs.
Teeth, inde
leaves an
lobes of a
•**Telmateia**
Tendrils, s
Tenellus,
Tenuifloru
Tenuifoliu
Tenuis, e, t
Tenuissimu
slender.
Teres, Ter
Teretiuscu
vertically
degree.
Terminal, f
of anythi
Ternate (le
Terrestris
ground.
Tesselate
squares
sometime
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fir-cone.
Testa (of s
•**Tetradyn**
•**Tetramer**
•**Tetraspe**
neither m
•**Thalamus**,
tacle on
are place
•**Thalloge**
•**Thallus**,
•**Theca, th**
•**Thecapho**
Thorns, se
Throat (of
portion a
part.
•**Thyrsus**,
Tinctorius
Tomentosu
tony, ent
Toothed (
p. 18.

Torus, the same as "disk," in the sense of a cushion.
*Triandrous, triandrus, a, um, having three stamens.
Tricolor, three-coloured.
Tridentatus, a, um, three-toothed.
Trifidus, a, um, three-cleft.
Trifoliatus, a, um, ternate-leaved.
Trifoliolate (leaf), see p. 13.
*Trimerous (flowers), see p. 34.
Trinervis, e, having three principal ribs.
*Tripetalous, having three petals, neither more nor less.
*Triphyllus, a, um, having three leaves, neither more nor less.
Triply-pinnatifid (leaf), see p. 17.
Triqueter, having three vertical ridges or angles (applied to plants with three-cornered stems).
Tubercles, minute bead-like swellings or pimples.
Tuberosus, a, um, having tuberous roots.
Tuberous (root), see p. 8.
Tubular (corolla and calyx), formed like a short piece of tube.
Turgid, swollen, puffed-out.
Twining (stem), see p. 9.

Uliginosus, a, um, growing in moist and oozy places.
Umbel, umbellule, see p. 40.
Umbellatus, a, um, having the flowers in umbels.
Umbrosus, a, um, growing in shady places.
Undulatus, a, um, when a surface rises and sinks alternately in gentle lines.
Unilateral, see p. 42.
Unisexual (flowers), see p. 33.
Unsymmetrical, sometimes used to signify that the sepals, petals, and stamens of a given flower are of different numbers, as in the *Ficaria verna.*
Urbicus, a, um, growing near towns.
Urens, stinging, like a nettle.
Usitatissimus, a, um, of the highest utility.

Vaginatus, a, um, forming a sheath.
Valvate (sepals and petals), when the edges of sepals or petals touch without overlapping.
Variabilis, e, changeable.
Varieties (of plants), see p. 49.
Varius, a, um, of different colours.
Vasculares, flowering-plants.
Veins (of leaves), see p. 19.
Ventricosus, a, um, inflated in a slight degree.
Vernalis, Vernus, a, um, blossoming in the spring.
Vernation (of leaves), see p. 26.
Verrucosus, a, um, covered with wart-like excrescences.
Versatile (anthers), attached by the middle, and balanced, so as to swing to and fro.
Versicolor, variegated; also changing colour as it grows older.
Vertical, rising perpendicularly, or in a perpendicular position.
Verticillate, Verticillatus, a, um, whorled.
Vesicarius, a, um, inflated like a bladder.
Vespertinus, a, um, appearing in the evening.
Villosus, a, um, covered with long soft hairs, and having a woolly appearance.
Viminalis, abounding with twigs.
Virens, green and flourishing.
Virgatus, a, um, twiggy.
Virginianus, a, um, native of Virginia.
Viridis, e, green.
Virosus, a, um, venomous; full of poison.
Vittæ, see p. 526.
Viviparous, producing leaf-buds, bulblets, or young plants instead of and in the place of flowers and seeds. See p. 710.
Volubilis, e, twining.
Vulgaris, e, and vulgatus, a, um, common and well-known everywhere.
Vulpinus, a, um, fox-coloured.

Waved (leaf), see p. 10.
Whorled (flowers), see p. 40.
——— (leaves), see p. 21.
Wing, any membranous or feathery appendage.
Winged (stem), when provided with leafy borders, as in the everlasting-pea.
Winged (seeds), when provided with any kind of feathery appendage, as in the dandelion.

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